Turing, Doing and Feeling

Alan Turing, born 100 years ago, invented the computer and computation and helped save Europe by decoding Nazi messages during World War II.

Turing also proposed a simple way to test scientific explanations of how the mind works: the Turing Test: If we can design a robot that is able to do anything and everything that a real human being can do (including speaking) – and can do it so well that people cannot even tell it apart from a real person -- then we have explained how the mind works, and the robot has a mind.

The challenge of passing the Turing test has created a new family of sciences called the cognitive sciences.

But what does it mean to have a mind? Turing’s robot can do anything and everything we can do, but does that mean it has a mind? Could it not be a “Zombie,” that acts exactly the same way we do, but mindlessly?

What does it mean to have no mind? A rock has no mind. A waterfall has no mind. A toaster has no mind. And surely computers have no minds. What do all these mindless things lack?

They lack consciousness. What is consciousness? It is the ability to feel – to feel anything at all, whether it is a pinch, or a puff of air, or the sound of a distant train, or the sight of a rainbow.

If the robot that passed Turing’s test could not feel, it would not have a mind, even if it could do anything we can do, indistinguishably from us. This is the difference between doing and feeling. It is also called the mind body problem.

But what about the brain? Surely if we want to explain how the mind works then the thing to study is not robots but the brain!

Well, yes, but alas the brain does not reveal the secrets of its functioning as easily as a heart or a kidney do. The brain can do what we can do, but observing and measuring brain activity only tells us where and when things happen in the brain: not how and why the brain can do what it can do. And doing is Turing’s territory.

What about feeling? The brain basis of consciousness is under intensive study by neuroscientists: How and why does the brain feel? This is the theme of the UQâM Summer Institute on the Evolution and Function of Consciousness:

What function does feeling perform in the brain? What can be done with feeling that cannot be done with just doing, and why? Feeling is a biological trait. What was the evolutionary advantage of feeling to our ancestors? What made those who felt survive and reproduce better, with the result that the ability to feel became encoded in our genetic material? Do lower animals feel – invertebrates, like snails or octopus, or even plants? Where did feeling start? and why?

And what about robots, Turing's territory? What (if anything) can they not do – what will they never be able to do – if they cannot feel? and why?

More challenging still: If a robot that can pass the Turing test does indeed feel, what is the causal role of the feeling, in the robot's internal functioning? All of us have the intuitive feeling that feeling has a causal role: I do what I do because I feel. What is the relationship between doing and feeling? And what about robots, Turing's territory? What (if anything) can they not do – what will they never be able to do – if they cannot feel? and why?

It feels as if my will is a kind of causal “force.” But is it? Whether we study the brain or we study robots, it always turns out that everything that either of them can do is fully explained by their internal functioning (more “doings”). There seems to be no room for further causes. Is feeling just a superfluous frill?

It is this role of consciousness as a causal force that leading specialists from all over the world, and from all fields – brain science, computer science, robotics, evolutionary biology, psychology, and philosophy – are coming to Montreal to ponder for 12 days (June 29 – July 12) in a unique interaction one hundred years after the birth of the founder of both the computer and the cognitive sciences.

Posted by Stevan Harnad

2 comments:

Vincent LeBlanc 7 August 2012 11:11
Après plusieurs lectures, je ne trouve pas de définition élaborée et complète de ce que comprend T3 et T4.

De ce que je comprend :

T3 : L’entité (robot? machine?...) a un corps physique doté de capacités sensorimotrices. Ses comportements observables de la vie de tous les jours doivent être identiques à ceux d’un être humain. Celui-ci doit être capable d’être parmi des humains pendant une vie entière sans qu’on aille la moindre raison de soupçonner qu’il n’est pas humain. Puisque l’on accepte que les êtres humains sont conscients, nous n’aurons aucune raison de supposer que celui-ci ne serait pas conscient.

T4 : L’entité correspond à l’ensemble de T3. En plus, il a les mêmes besoins physiologiques que nous (manger, dormir, respirer) afin que ses cellules puissent se réparer et se multiplier.

En fait, le T4 franchi la barrière entre le vivant et le non-vivant, alors que T3 serait un hybride, un peu comme un virus qui est à la limite entre le structure minérale et la structure vivante.

Y a-t-il d’autres critères ou des nuances que je ne comprends pas? Ce test a-t-il été opérationnalisé?

Finalement, quel est le but du test de Turing? À quoi nous servirait-il? Que serait ses applications? J’ai beau essayer de comprendre pourquoi on tente de répliquer un être humain, je ne vois pas de raisons ou d’applications pratiques autre qu’une forme de masturbation intellectuelle (qui est, soit dit en passant, une de mes activités préférées). Je vois les applications de créer une intelligence supérieure (consciente ou non) ou de comprendre comment l’être humain fonctionne, mais en quoi le synthétiser nous amènerait quelqu’un d’une pratique de travail?

Stevan Harnad 9 August 2012 06:59
LA METHODOLOGIE ET LE DEFI DE TURING

L’hierarchie des TTs est décrite ici:

Tu as sauté T3 (capacité verbale) et l’insuffisance du calcul seul.

Tu as bien décrit T3.

Pour T4 ça continue à s’agir des actions observables, mais cette fois-ci on inclut non seulement les actions extérieures du corps intégral, mais les actions à l’intérieur de sa tête. Tout ce qu’on peut observer et mesurer dans le cerveau doit être également présent dans le robot T4.

(Mais, d’autant qu’on peut avoir les mêmes actions synthétiquement, ça pourrait être synthétique plutôt que biologique. Si on insiste sur toute propriété biologique, alors ça devient T5.)
Concernant l’opérationnalisation: C’est un peu prématuré, étant donné qu’on est encore si loin de T3! Mais c’est sur que la méthodologie de Turing est tout ce qu’il y
d’opérationnell!

Concernant la masturbation intellectuelle: Tu ne vois pas d’application pour un mécanisme qui pourrait réussir T3? Et comment veux tu démontrer que tu as effectivement
découvert le mécanisme qui génère nos capacités si tu ne peux pas démontrer qu’il est capable de générer les capacités en question?

C’est ça la métho et le défi de Turing.

Dan Dennett: A Phenomenal Confusion About Access and Consciousness

Dan Dennett A Phenomenal Confusion About Access and Consciousness

Abstract: Many researchers on consciousness have adopted Ned Block’s purported distinction between "access" consciousness and ‘phenomenal’ consciousness (Block, 1995, 2005, 2007), but in spite of its evident appeal, it is not a defensible distinction. Earlier critiques (Dennett, 1994, 1995, Cohen and Dennett, 2012) have not deterred those who favor the distinction, but perhaps one more exposition of the problems will break through.

http://web.gc.cuny.edu/cogsci/private/Block-TICS.pdf
http://andromeda.rutgers.edu/~kbalog/Web%20publications/Block-BBS.pdf

Comments invited

Posted by Stevan Harnad

36 comments:

Stevan Harnad 29 June 2012 07:09
Dan asks: “What is phenomenality?”
Answer: Feeling. We all know what it feels like to feel.

Dan is right that there are not 2 consciousnesses, “access consciousness” and "phenomenal consciousness”.

But there is certainly one. And it is the (cartesian, indubitable) fact that we feel (when and what we feel when we are feeling), and unconscious entities lack that, we are
here to discuss.

It is the causal role of “that” that this Turing Institute is about.

Dan is talking about ontology: what is the (felt) vision of the red stripe?

But the hard problem is explaining how/why, not ontics.

Vincent LeBlanc 30 June 2012 15:23
Stevan rightly says that the hard problem is that of explaining how/why there is phenomenal consciousness (or "feelings" - if we prefer).

However, asking this question in such terms already presupposes some sort of ontological stance, namely dualism or at the very best some sort of conservative
reductionism. The hard question - as Chalmers puts it - is how/why we have (specific sorts of) phenomenal consciousness on top of “mere” neural/physical/bodily activity.

I acknowledge that there are very strong reasons (based on introspection) to hold that there is something it is like to "feel" the redness of the flag stripe - regardless of
whether that is an illusion or not. To me, it feels red. What makes the character of any conscious experience (such as "feeling" the redness of the stripe) peculiar, is its
subjective character, the fact that it feels something to me.

And that - phenomenal experience - is something that could - at least logically - be absent (in a zombie world) without there being any functional difference in how that world
would work.

As Stevan says, how and why conscious experience "is there" is what needs an explanation.

Now, the problem is: what kind of explanation are we looking for? What kind of _ would satisfy us? Do we need empirical studies showing us "how" and "why" we feel
redness - what causes us to feel it? Or is it sufficient to give a developmental/evolutionary answer such as: consciousness is there (it has been preserved in natural
selection) because it plays a causal role that an unconscious system could not achieve in an equally efficient (economic) way?

If the latter is the way to go, of course, we would have to focus on understanding what that causal role is, and we would have to focus on an even harder question, namely
that of explaining how conscious experience (the subjective “feeling”) could ever be causal - since by definition we ontologically separate it (in some way or another) from
the physical domain. Are we ready to drop the causal closure of the physical domain just to fit in conscious experience?

There is still quite a lot of work for philosophers here, and I think that the ontological question should always remain in the background if we do not want to fall into a
regression...

Vincent LeBlanc (Université de Lausanne, Switzerland)

Stevan Harnad 30 June 2012 19:19
Your points are all valid — except the problem is not, I think, ontic, but epistemic. It is “explaining” the causal function of feeling that we seem to be unable to do (on the overwhelmingly reasonable assumption that psychokinesis is false).

Camelia 1 July 2012 19:08
I liked this distinction between “access consciousness” and “phenomenal consciousness”. I agree with you, that are not two types of consciousness, but only one with two stages. It is possible to not arrive as human in the second stage.

But I can’t say, that in the second stage, we are not able to feel, but the feeling experience is basic. This is the degree difference between the two stages.

The example that I have is the case of autism. Of course, it is depending what autistic level. But I wonder if it is not possible to say that in some autistic cases, we have only “access consciousness” and not phenomenal.

I need to understand that I am thinking correctly.

In some high-functioning autistic people, I will have also a phenomenal consciousness.

Pauline Claude 12 July 2012 18:30
OTHER COMMENTS FROM FACEBOOK:

CHRISTIANE BAILEY:

*Maybe Access-consciousness should be name “attention” instead of consciousness and “consciousness” could be kept for feeling and experiencing?*

Stevan Hamad:

*The problem is not what you call it; the problem is that access is not conscious unless it’s felt. Ditto for attention (which, if unfelt, is simply information detection or selection).*

Arnold Trehub 14 July 2012 07:57
Why can’t we legitimately say that:

a. Feeling is subjectivity.

b. Subjectivity is realized by a particular system of neuronal mechanisms in the brain.

c. The brain mechanisms that constitute subjectivity are a relatively recent evolutionary adaptation.

This theoretical stance regarding consciousness/feeling/subjectivity is presented in the following publications:

http://people.umass.edu/trehub/YCCOG828%20Copy.pdf

http://theassc.org/documents/where%20am%20i%20redux

http://eons-experientialism.freewebspace.com/trehub01.htm

Adele Tufford 30 June 2012 16:12
From the standpoint of a basic neurobiologist currently working in the retina - I am finding it difficult to process Dan’s supposition that a concrete, material flag image falls into a different realm than the after-image of the red stripe.

The afterimage is well understood to be compensation by photoreceptors after colour bleaching. Following that this cone-produced signal activates retinal ganglion cells in the same way as the image originating from the external world - and in subsequent processing our visual cortex is entirely unable to make the distinction between a real image and an after-image, then how are these cognitively appraised in a different way? Dan seemed to indicate that it was the ‘immateriality’ of the red-stripe after-image which negated its value as a conscious experience - BUT, if the two are the same at the level of the retina and upwards, where does the difference lie?

Does Dan suppose that it is the access to the knowledge that the image does not actually exist which creates a dissociation between the two?

Any clarification here?

Adele (facebook-less) Tufford, McGill

Stevan Hamad 30 June 2012 17:38
I think your point is valid, so I cannot answer for Dan. The only difference between the feeling of seeing red when photons from a red surface hit my retina and seeing red after my cones have been bleached by photons from a green surface is the input and neural substrate. What does that tell us about feeling one way or the other?

Stevan Hamad 30 June 2012 19:25
Dan’s position can be summarized in one sentence: Once you’ve explained how and why organisms can do everything they can do (as Turing urged), there’s nothing left to explain.

The trouble is that feeling is not something we do, it’s something we feel. And even when all’s said and done about doing, it remains to be explained how and why we feel.

Morgan Smith 3 July 2012 16:31
Prof. Dennett argues further that Phenomenal Consciousness, what we perceive as experience and causation of consciousness as a whole, is in fact just a property of it. Dennett argues that experience lies in the ability to “access” — he says that our world and conscious experience are both founded upon affordances, e.g. a cup affording holding or drinking (as Gibson would say).

I tend to agree with him here. If we create, perhaps by way of evolutionary robotics, an artificial mind of the type in which we are here interested, it won’t be that we finally understood the basis of phenomenal experience and proceeded to implement it. When we finally deem some artificial mind intelligent, with phenomenal capacities, it will be that it has crossed some subjective threshold beyond which we cannot any longer differentiate man from machine. Phenomenal consciousness will have “appeared” to us at this point, after having been engineered in every capability that allows it to perform something we perceive as innately human.

These will have been our expectations being displayed in our creation. At this point, our AI will be able to encode new information, analyze it, access it later. It will have motivations and analogs of our mental/emotional states, and it will use words like “feel” to describe them to us. Once the robot provides output that indicates presence of phenomenality, we can’t hope to discredit it, and we still won’t really know the true origin of the subjective experience we refer to as “feeling” or “consciousness”.

Arnold Trehub 9 July 2012 13:35
Stevan: “The trouble is that feeling is not something we do, it’s something we feel.”

If you agree that the brain causes conscious experience, why wouldn’t you agree that feeling is what the brain does?

Stevan Hamad 2 July 2012 04:41
Unless it is felt, “awareness of,” “consciousness of” etc. all just mean access to some information. And information is just data, unless it is felt.

What (IMHO) Dan should have said about “access consciousness” vs. “phenomenal consciousness” was that there is no “access consciousness” — there is only access to information. That information can either be felt or unfelt. If unfelt, then it’s just mindless information-processing (i.e., doing). If it is felt, then we have the only...
consciousness there is, which is feeling (so why bother with the long and redundant synonyms "phenomenological consciousness")?

But of course that's not what Dan said. Rather, what he said was that there is no phenomenological consciousness! Rather, what we really mean by consciousness (and feeling) is just access (i.e., just doing, no feeling -- or rather what we mean by feeling is just certain doings -- the "accessible" ones we can talk about...)

Maxwell J. Ramstead 3 July 2012 10:10
The question is, however: Does the value of emotion in evolutionary terms depend on emotions' being felt? In other words, perhaps it is the very fact that emotions feel like something which yields the functional, adaptive value of emotions. Perhaps emotion is the limit-case at which feeling and function coincide. What I am suggesting is that for representations of internal, homeostatic states, maybe access really just amounts to feeling. Perhaps feeling is the organism's means of access to its own internal state.

Martha Shiel 3 July 2012 13:40
Steve, I like the idea that there is only access to information, and that information can either be felt (i.e., what we call conscious) or "mindless information-processing" (maybe "sensing" would be a better term?). I'm convinced. Any ideas as to how Dennett would reframe this idea?

According to this view, consciousness is a process for us to access information. Now we need to speculate on why this particular process has been advantageous.

Maxwell J. Ramstead 3 July 2012 14:33
Perhaps it is advantageous to feel, because such feeling-states are precisely the most adaptive way to represent internal homeostatic states?

Stevan Harnad 13 July 2012 10:28
Since access to information can be either felt or unfelt, the question is how and why felt access is advantageous.

Pauline Claude 25 July 2012 06:48
Maybe the question "how and why felt access is advantageous" has to be taken in terms of timing: mainly, when are we feeling and when are we doing? are we feeling and doing at the same time, or are we feeling and then doing, or are we doing and then feeling? when does the doing need the feeling to be done? to which extend the doing needs the feeling? why do we do things without feeling and why do we do things that cannot be done without feeling? I know, there's the argument that in theory, everything we do could be done without consciousness, but let's have a look in a species context. As humans for instance, if we don't feel the pain because we are anesthetized, if we are not felt anything so we won't do anything. So, in that case, the doing need the feeling. So if the doing need the feeling for some specific kind of doing, the feeling has to have its own purpose.

To understand this purpose we have to compare what is felt and what is unfelt in relation to what is done and what isn't done in different situations. This can be done by looking at "abnormal" (or altered) states of consciousness compare to a "normal" state of consciousness.

Stevan Harnad 2 August 2012 18:42
Good questions, Pauline, but no answers. (And the right comparison is not an anaesthetized and unresponsive human but an unfeeling yet responsive robot.)

Camelia 3 July 2012 17:27
Thus, we can say that the distinction between many consciousness is did by the feelings, but finaly all creatures (or almost, human persons at least, even with disabilities) can have this consciousness which is understood the access to information?

But this is also a little complicated, because there is people who don't have access to information, very low mental impairments?

Thus? How can we relate "access information" to the concept of consciousness?

Thanks Camelia Dascalu (Paris 3 University)

Nooemi Stern 14 July 2012 10:58
Yeah, this is a really good point! What about people with mental disabilities that do not allow them to access lots of information... do you deny that they feel things?

This is a difficulty for Dennett I think because he seems to deny that there can be feeling (phenomenal consciousness in his terms) without access to information (or access consciousness). I guess you could argue that people with low mental capabilities are still getting some information from the external world and therefore are feeling as a result of the information that they are getting. Or it could be as Maxwell said earlier - that feeling is the organisms means of access to its own internal state (but is your internal state independent of the external world)?

I don't get the qualia language. Why refer to "what it is like to feel something is red"? Instead of just asking what is the color red (the sensation not the wavelength of light) and what causes it? Perhaps this language is only intended to clarify that one is referring to the sensation of color or sound, and not photons and physical sound waves. But how could the color red be an illusion? Even if it were in any sense an illusion, this would be beside the point. I know the color red exists because I see it. The question is what exactly is and is causing the sensation of color, whether or not it is an "illusion."

Frédéric Beaudet 7 July 2012 07:20
Good remark, I find it very difficult to talk about illusion/or not, feeling/or not when we "feel" or "see" an epiphenomenon. After all, all that we have access through consciousness is related to our body that is sensible to other bodies. In my eyes, that kind of "epi red stripes" are red because some way the red nervous configuration have been activated. By the way, for me Dennett have made his point convincing, it's clear that the distinction pia is unclear.

Stevan Harnad 13 July 2012 10:35
REALITY, ILLUSION AND CAUSATION

The problem is not whether the feeling of seeing red is real or an illusion.

Of course the feeling is real, if we are feeling it.

Nor is the problem whether there is really a red object out there, when we are seeing a red object.

The problem is the causal role of the fact that the red is felt, rather than merely detected and acted upon (doing).

Nico Sheppard-Jones 16 July 2012 09:53
How do reality, illusion and causation apply to various sleep states? What is happening when we dream of the color red? Are we feeling?

Alexandre Duval 12 July 2012 14:32
It's not entirely clear to me how Professor Dennett's argument against Ned Block's distinction between P-consciousness and A-consciousness is supposed to go.
How does his talk about our propensity to get causal links backwards (e.g., our propensity to think that we like sweet food because it is intrinsically sweet) helps him to undermine Block's distinction? Here's how I understand it (tell me if I am wrong): 1- Just like we are sometimes lead to postulate that some external objects have intrinsic properties that are not in fact intrinsic (e.g., sweetness, cuteness), we are lead to postulate that some internal objects have intrinsic properties (e.g., phenomenality) that are not in fact intrinsic. 2- So, the idea of phenomenality (or phenomenal-consciousness) as an intrinsic property of some mental objects is confused. 3- The only way to maintain a workable notion of 'consciousness' in cognitive science is to go back to Block's notion of A-consciousness, which is the only one we can have. If my interpretation is correct (and I'm not sure it is), then, why should we accept premise (1)? Dennett has given us no ground to believe that the analogy is valid. (Originally posted on FB.)

Stevan Harnad 13 July 2012 10:50
THE DISTINCTION BETWEEN APPLES AND FRUIT...
Access to information (data) is access.
Consciousness of information is consciousness.
We are conscious of information only if and when it feels like something to access it.
Block distinction between "access consciousness" and "phenomenal (i.e., felt) consciousness is incoherent.
Access can be felt or unfelt.
If access is not felt, it is no kind of consciousness.

Pauline Claude 12 July 2012 18:46
COMMENT MADE ON FACEBOOK BY Stevan Harnad :
"Dan's Darwinian explanation is about "doing" what it takes to survive and reproduce: it doesn't explain why it "feels" like something to do those things."

Stevan Harnad 13 July 2012 10:52
The adaptive (hence causal) value of emotions is in what they dispose us to do or not do. The adaptive (hence causal) value of the fact that they are felt is another matter (and a hard one...)
Arnold Trehub 27 July 2012 09:43
Stevan: “Whether we do because we feel or we feel because we do, the causality has to be cashed out, because, on the face of it, doing seems enough, biologically and functionally.”

The retinoid model of consciousness “cashes out” the causality of feeling. Stevan, do you know of a competing brain model that cashes out the causality of feeling? Do you have a principled objection to the retinoid model of feeling?

Matthew Leavitt 24 July 2012 14:53
Daniel Dennett mentioned people’s reactions to Cog’s humanoid actions. Here’s an intro to some interesting work in that area: http://en.wikipedia.org/wiki/Uncanny_valley

Antonio Damasio: Feelings and Sentience

Antonio Damasio
Feelings and Sentience
(video unavailable)

Abstract: Reflection on relevant research findings, new and old, has changed my views on two issues: the origin and nature of feelings and the mechanisms behind the construction of the self. The goal of this talk is to consider how the human brain needs to be structured and how it needs to operate in order for conscious minds to emerge.

http://www.usc.edu/schools/college/bci/documents/SCTM%2020%20final%20front%20to%20%206%2010901.PDF

Damasio, Antonio; Thomas J. Grabowski, Hanna Damasio, Daniel Tranel (2012) Persistence of Feelings and Sentence after Bilateral Damage of the Insula. Cerebral Cortex.http://cercor.oxfordjournals.org/content/early/2012/04/03/cercor.bhs077.short

Damasio, Antonio (2011) Neural Basis of Emotions. Scholarpedia

http://people.hnl.bcm.tmc.edu/jli/reference/32.pdf

Comments invited

Posted by Stevan Harnad

26 comments:

Maxwell J. Ramstead 3 July 2012 09:52
Perhaps the very fact that a feeling is felt gives the system an evolutionary advantage. I am humbly suggesting that what was selected in the process of evolutionary drift was the felt sensation itself. It could very well be that the system designed by natural selection to represent such internal states as homeostatic equilibrium was precisely just that—feeling. Maybe feeling simply just is what Damasio says it is—the body’s way of representing to itself its own internal state of homeostatic equilibrium. If that is the case, then it would be easy to imagine why feeling would be selected over non-feeling—i.e., because an organism capable of spontaneously representing to itself its own internal state would have a higher reproductive success rate.

Although this does not explain why feeling evolved in the first place, we might consider that feeling was perhaps an exaptation—something that evolved accidentally, and was retained because it was advantageous. Maybe the question: “Why/how are felt layers of homeostatic control more effective than just done layers of homeostatic control?” is misguided, because feeling is quite simply just that. Perhaps “done layers of homeostatic control” are done by feeling them.

Stevan Harnad 11 July 2012 12:48
FROM ANTONIO DAMASIO:

To Maxwell J. Ramstead, I am pleased you got my point. Yes, feeling itself might be the unit of selection. And yes, it might be an explanation. But the evidence suggests that there are integrated maps of body state operating without feeling and still effective as regulating agents.

Stevan Harnad 11 July 2012 12:56
UNDONE DEAL

SH: “Why/how are felt layers of homeostatic control more effective than just done layers of homeostatic control?”

MJR: Perhaps “done layers of homeostatic control” are done by feeling them.

Sounds like solving a tough problem with a tautology (or a definition)...

No, it is inescapable that homeostasis is homeostasis (doing). We can generate homeostasis with adaptive servomechanisms (doing). We can make them more and more complicated and capable (still doing). How and why at some point all of this makes a phase transition into feeling is still awaiting an explanation. (So far, not even a clue of a clue...)

kriszt 11 July 2012 14:44
Perhaps we should look at marine beings, because fish don’t necessarily have feelings?

Martha Shiell 3 July 2012 13:49
Damasio suggested that consciousness functions to maintain homeostasis. An audience member challenged this with the example of an amoeba, which (based on the assumed agreement of many people) is not conscious, but that also has a drive to homeostasis. In his response, Damasio should have emphasized that an amoeba’s drive to homeostasis requires very little integration of sensory information as compared to the more complex organism’s that exist, so it is not a fair comparison.
Antonio Damasio: 6 July 2012 12:57

To Martha Shiell. First, an amoeba has some degree of “sentience” if not consciousness. Second, I did emphasize the simplicity of the system. Third, I was not making a comparison, fair or unfair.

Martha Shiell: 17 July 2012 08:03
(Thanks for relaying the , Stevan!)

Carey YL Huh: 6 July 2012 14:28
Dr. Damasio gave some consideration of the upper brainstem (pons and midbrain) as potentially playing a role in subserving ‘feelings’. What I am wondering is, if both the insular cortex and the brainstem may be neuronal loci where ‘feelings’ may arise, how do these areas communicate? Are there times when they produce opposing signals and the conflict is somehow resolved? What would be the purpose of having this redundancy?

Stevan Harnad: 11 July 2012 12:57

To Carey YL Huh. It is not a redundancy. Practically all the systems we can consider, sensory as well as motor, have different ways of achieving somewhat comparable but not quite equal goals. The different ways are related to different levels of the neuraxis, from the bottom of the spinal goals to the brain stem and to the cortex. The operation of those varied levels is connected with a different kind of other process. Cortical examples, relates to factual memory, imagination and reason. Brain stem feeling relates to a host of defense mechanisms. Only the overall goal — life regulation — is the same.

Roxane Campeau: 12 July 2012 12:20
Comme je suis actuellement très intéressée par l’impact des débats sur la conscience par rapport à la conceptualisation de l’esthétique en musique, je n’ai pu m’empêcher d’accrocher sur cette phrase dite par Damasio lors de la période de question:
"You could juxtapose your feelings with beautiful sounds"

J’essaie de comprendre ici ce que cette phrase implique. Selon Damasio, est-ce que les sons eux-mêmes sont porteurs de l’expérience esthétique (beautiful sounds)? L’expérience esthétique musicale réside-t-elle dans la juxtaposition d’états émotionnels déjà présents sur le stimulus auditif? Alors, est-ce que les sons révèlent à la conscience l’état émotionnel ou n’est-ce pas plutôt l’état émotionnel qui confère aux sons leur “beauté”?

Stevan Harnad: 13 July 2012 08:42
If you are hearing the beautiful sounds then you are feeling (what it feels like to hear) the beautiful sounds. So, no “juxtaposition,” just identity.

You can, of course, juxtapose feelings and feelings.

Why beautiful music sounds beautiful rather than just acoustic is another matter, closer to the question of why sugar tastes sweet and inviting rather than neutral than to the question of why anything feels like anything at all.

Pauline Claude: 16 July 2012 08:50
POSTED ON FACEBOOK BY Marjorie Morin:

"I don’t know if some of you can help me with this question, but while listening to Damasio’s talk, I was asking myself how when you feel compassion or empathy you could "map" your body states. Is there really a body state associated with compassion or empathy? (He said that mental contents of feelings corresponds to description of aspects of body states) If thinking about empathy, we know that we imitate the other unconsciously in order to comprehend what he/she is experiencing, it really isn’t a complete enough "bodily state" to create a feeling of empathy with. Empathy also need self-awareness to know that it’s the other and not the self that is experiencing this emotion. I think it’s quite a challenge to explain (or maybe not?)"

Pauline Claude: 16 July 2012 08:54
Pauline Claude
"I’m not a 100 % sure but... Empathy requires the activation of mirror neurons. The same mirror neurons fire both when someone do a specific action and when she/he observes another person doing the same action. That’s what happen with empathy, wich means that the same neuronal network is being activated when you see someone feeling sad for instance when you are sad yourself. Then, there are the same neurones that activate body mapping. Of course, other cognitive processes (such as others awareness) have to be engaged in the phenomenon to remind the brain that the person experiencing sadness is not yourself but the person you are looking at. This leads to the question of the evolution of sociality (in the primate way) and self- and others-awareness... which one came first? We know that only a few species have the capacity of self-awareness compared to species that have the capacity of others-awareness. This is mere speculation but, would it be possible that in primates, specific environmental constrains forced individuals to live in groups when they were not used to, leading to a new adaptation consisting of a new neuronal mechanism evaluating other's behavior in order to maximize your own survival and reproduction for mere egoistic purposes, which means the need of self-awareness..."

Inge Broer:
"Here’s a path to explore: There is a form of meditation where the main goal is to cultivate compassion and empathy for fellow humans. Practice includes reciting specific words and phrases in order to evoke a boundless warm-hearted feeling."

Stevan Harnad:
"Everything I feel is "my" feeling, hence, I suppose, about my body. But beyond that, I do not see why all or even most feelings should be somatic in any other respect than that they feel like something."

Pauline Claude:
"How could a feeling not be somatic?"

Stevan Harnad:
"It feel like something to believe 2 + 2 = 4 (or to disbelieve it). Feeling is in general only somatic in that it's our body that feels as if it’s feeling."
"But, don't we have a problem with the definition itself of feeling? because, from my understanding of Damasio's point of view, a feeling is not necessarily felt in the sense that it tells the brain that a homeostatic need has to be fulfilled but doesn't reach necessarily the level of consciousness in the sense "I know that my brain know that something is going on". However, can the fact that the brain recognizes a signal (a feeling) as a homeostatic need without reaching the level "I know that my brain know" be considered as consciousness?"

"Learning and prediction, yes: But why felt?"

Homeostasis and the representation thereof to oneself is certainly a key concept. I think it is the one thing that everything we've heard during the conference builds upon. Robotics is facing the challenge of self-monitoring states and integrating information from the outside world, we learned about alypsia and about all sorts of animals and how they face these challenges, the evolutionary perspectives examine how this system can become more and more sophisticated and the neuropsychology representatives taught us more about how integration of information is achieved.

All that is fine and well, but I guess I'm starting to see the question now: Why is it important that we FEEL? Can all this not be achieved without our consciousness? And indeed a lot of it is.

However, I think Searle, at the end of the conference, kind of put things into perspective again: Yeah, OK, maybe it could have been done without the feeling, but we THAT'S NOT THE WAY IT IS, WE DO FEEL. Somehow I feel that studying what is is the way forward and Damasio brought in a fantastic perspective: apart from the information processing we do of the outside world, we do a fantastic amount of processing of the inside world as well and this needs to be taken into consideration.

"Why is it important that we FEEL?"

Extending our definition of doings to include a wider behavioural repertoire appears to me like a necessary step to be able to offer an evolutionary explanation to feelings.

"Feeling makes us better at doing?"

Extending the range of studied doings to include more elaborate behaviors or thought processes that are characteristic of the primate repertoire (i.e. like social decision-making) offers probably the best chance to identify any function of feelings. My argument simply follows from the demonstration by some speakers (e.g. Sossin) that entire behavioral repertoires can be produced without any apparent conscious thoughts in lower animals.

Does feeling make us better at doing?

I think this is what MUR's remark (first comment on this page) was getting at, and I interpreted a few of Dr. Damasio's points as also suggesting that this might be the case. At any rate, it seems to me the most intuitive approach to the whole feeling/doing distinction.

How? Why?

"Homeostasis requires sensing of body states – but why felt sensing? Why not just detect and do what needs to be done?"
Joel Pelleletier

"Would an asocial human stranded and raised in isolation on an island feel or would he just react to bodily needs?"

Marjorie Morin

"Jules: I guess your question could be answered thinking of animals. Do animals have a consciousness? Do they feel their hunger or just act on them? As we have seen Dennett thinks that since the language is missing, animals and newborns aren't experiencing consciousness (I was really surprised by that statement), at least not as we grow-ups do. When thinking about language there is always the problem of mute people and apes that learn sign language. They do have a language, but not the same as we do, what about their consciousness? I'm really a newbie in this field so I'm just thinking of some points that can be addressed. But in his view, and he told it himself, the isolated person wouldn't experience consciousness as we do. Damasio's point of view on the other end was more open to an animal possible consciousness, he said that we couldn't know if they feel since they cannot tell us. I don't know if i'm right but it seems that language was less important for his theory than for Denson's. I'm still confused by the difference between feeling versus emotions, versus sensations. I guess as the 10 days passes (and reading is done) it will become clearer!"

Joseph LeDoux

The Perplexing Relationship Between Emotions and Consciousness

Joseph LeDoux

The Perplexing Relationship Between Emotions and Consciousness

Abstract: I propose a re-conceptualization of key phenomena important in the study of emotion—those phenomena that reflect functions and circuits related to survival, and that are shared by humans and other animals. The approach shifts the focus from questions about whether emotions that humans consciously feel are also present in other animals, and toward questions about the extent to which circuits and corresponding functions that are present in other animals (survival circuits and functions) are also present in humans. Survival circuit functions are not causally related to emotional feelings but obviously contribute to these, at least indirectly. The survival circuit concept integrates ideas about emotion, motivation, reinforcement, and arousal in the effort to understand how organisms survive and thrive by detecting and responding to challenges and opportunities in daily life.


Comments invited

Posted by Stevan Harnad

17 comments:

Maxwell Ramstead

3 July 2012 12:24

If, as Doctor Ledoux has suggested, there is no centralized “feeling center”—that is, if instead of there being a centralized phenomenon called “feeling,” there are a variety of specialized survival circuits that represent different irreducible aspects of specialized, adapted behavior (emotion, motivation, reinforcement, arousal, etc.), then we may not be looking for the right kind of brain-event when we investigate into the nature of phenomenal consciousness.

Could Ledoux’s view imply that what we call “feeling” is itself variegated and multifaceted? —that is, that we are attempting to flesh out the evolutionary advantage and function of a centralized “feeling,” whereas we should be looking for a host of related yet independent phenomena, which are all felt differently and are only superficially related?

Joseph LeDoux

6 July 2012 09:15

I apologize. Survival circuits are not “feeling centers.” They are survival mechanisms that have their origins in the first single cell organisms. Single cells do not have circuits but they do have survival functions that are then controlled in more sophisticated ways when organisms began to have nervous systems. Survival functions do not exist to make feelings but instead to allow organisms to survive and thrive in their environments. When the nervous system of an animal has the ability to be conscious of its own activities then feelings result. This is true of humans. To the extent it is true of other organisms is impossible to know. But it is highly likely that if other organisms have feelings they will be very different from the states that humans characterize with words like fear, sadness, anger, joy, love, much less pride, jealousy, or envy. Circuits that control defensive behavior are similar in humans and other mammals. But the subjective experience of fear, the feeling of being afraid, is not simply due to the activity of the defense system. What theory of emotion needs to explain is the activity of circuits that underlie the experience of fear, such as the amygdala. I cannot see how activity in the amygdala could be seen as similar to the subjective experience of fear.

Martha Shiell

3 July 2012 14:20

I'm sorry, I must not have been clear. I apologize. Survival circuits are not "feeling centers." They are survival mechanisms that have their origins in the first single cell organisms. Single cells do not have circuits but they do have survival functions that are then controlled in more sophisticated ways when organisms began to have nervous systems. Survival functions do not exist to make feelings but instead to allow organisms to survive and thrive in their environments. When the nervous system of an animal has the ability to be conscious of its own activities then feelings result. This is true of humans. To the extent it is true of other organisms is impossible to know. But it is highly likely that if other organisms have feelings they will be very different from the states that humans characterize with words like fear, sadness, anger, joy, love, much less pride, jealousy, or envy. Circuits that control defensive behavior are similar in humans and other mammals. But the subjective experience of fear, the feeling of being afraid, is not simply due to the activity of the defense system. What theory of emotion needs to explain and what it needs to be based on are different. Some emotions are contributed to by processes controlled by survival circuits and others are not. These underlying brain processes are part of what a theory of emotion needs to be based on. Survival circuit activity is not a qualification for something being an emotion, therefore we need a theory of emotion that accounts for both kinds of states called emotions (those that have connections to survival circuits and those that do not).
Andrey Chetverikov 6 July 2012 10:08
LeDoux's talk seems to be rather pessimistic. Okay, emotions and systems that we have studied for many years are not the same thing, so let's forget about emotions and study those systems. It is good that he acknowledges this distinction, but I think that it only highlights the need for psychologists to develop better theories of emotions, when we will (finally) understand what is an emotion, then we can probably understand what is a 'fear system' in the brain, and how can it relate with more primitive systems, such as the ones described by LeDoux.

Joseph LeDoux 6 July 2012 09:16
I agree completely. We really need a good theory of emotion. What I have tried to do is outline what a theory of emotion needs to explain as opposed to what it needs to be based on. Emotions are subjective states, feelings. This is what needs explaining. Some emotions are contributed to by processes controlled by survival circuits and others are not. These underlying brain processes are part of what a theory of emotion needs to be based on. Survival circuit activity is not a qualification for something being an emotion, therefore we need a theory of emotion that accounts for both kinds of states called emotions (those that have connections to survival circuits and those that do not).

Inge Broer 16 July 2012 10:21
I'm wondering a little about the distinctions between emotion, feeling and system brought up. Could they be categorized by function?

The direct life-preserving (homeostatic) systems like: hunger, cold, feeling tired, feeling afraid...

Social-states that modulate our experience of others: Jealousy, love, admiration, ...

Or do they operate in different ways completely?

Also, I'm wondering whether it would be possible to be in these states without being aware of it? Acting jealous, in love, admiring, hungry, afraid...without being aware of FEELING these things (as in being able to report feeling) and even without actually FEELING these things? It's a bit confusing.

Stevan Harnad 21 July 2012 18:14
1. Emotions are felt, hence they are feelings.
2. "Having" an unfelt emotion makes as little sense as "having" an unfelt feeling.
3. Homeostasis is just the maintenance of internal states. A thermostat is a homeostat.
4. And homeostasis is doing, not feeling.
5. Appetite is felt homeostasis – but the fact that it is homeostasis does not explain how or why it is felt.
6. You can feel jealousy without realizing that what you are feeling is jealousy, just as you can see a mirage without realizing that you are seeing a mirage: You find out later what you were feeling (or seeing) earlier (maybe based on your later feelings or behavior).
7. But while you are feeling something, you always know you are feeling like that. What it feels like is what it feels like. (It just may not yet feel like jealousy.) (What felt like a stress headache might turn out to have been a migraine.)
8. Or another way to put it might be that you do not yet realize that feeling like that means you are feeling jealous.
9. Feeling like that, and knowing it means you're feeling jealous, feels different from feeling like that and not knowing it means your jealous.
10. In other words, it feels like something to mean, and meaning something else feels like something else, even if the difference is small or subtle.
Marjorie Morin     25 July 2012 11:50
Originally posted on facebook
Stevan Harnad     
"eDoux talk: Question is not whether your cat feels same as you, but whether it feels (and why/how). http://users.ecs.soton.ac.uk/harnad/TuringEvolutionConsciousness.html#edn3"
Marjorie Morin     
"Will we ever be able to answer this question since we rely on language to know if humans "feel" and the "language" of the other animals is unknow to us? Also, I haven't completely comprehend how Mr. Edelman showed that the octopus WAS in fact conscious. It sees, it learns, it seems to understand some things, but does it feel? We don't and can't know that?"
Stevan Harnad     
"I don't need language to feel that my cat feels. Probably it would be the same if I had an octopus."
Marjorie Morin     
"But does you feeling that your cat feels mean he does? How can something you feel be a reality for another being? I don't really know how to say that, but it's like saying you feel your computer feel, it doesn't make it true. Maybe I don't understand what you mean, but I think their consciousness (I do think they have one) isn't accessible to us. We anthropomorphize them a lot but the reality is we don't really know what's going on for them, how it works, how it feels in their shoes. What it feels for them to feel their paws on the ground, or feel hunger etc. I know that it's not really the focus of the summer school but it's still very intriguing. I'm really puzzled by your comment could you elaborate a little please?"

Stevan Harnad     29 July 2012 19:55
The other-minds problem guarantees that we can never be sure that any entity other than ourselves. But we can be pretty sure. For example with other people, because they act like they feel (and not just because they say to).

Animals too.

Alexandre Duval     25 July 2012 15:44
Dr. Ledoux makes the case that there is no unified fear system. Rather there are various survival circuits that trigger different kinds of fear responses (e.g. fear of predator as opposed to fear of starving). Assuming this, I wonder why it often seems to us that all fearful feelings have something in common in virtue of which we can recognize them immediately as feelings of fear (in normal circumstances). To put it in a philosophical terms: I wonder why it often seems to us that fearful feelings have a similar phenomenology and that we can report and identify such feelings in virtue of their similar phenomenology. (I know LeDoux did not want to speculate on the mechanisms that gives rise to fearful feelings, so this is certainly not meant as a criticism.) Does it entail that feelings of fear (as opposed to fear responses) to have to be produced by (or linked to) a singular system or mechanism?

Xavier Déry     31 July 2012 11:12
Hearing "We don't know" a lot, but to me it indicates honest, sound science. 'Not knowing' now can be on the way of finding out.

Matthew Leavitt     7 August 2012 23:41
I'm curious about how phobias (i.e. fears that are irrational given the likelihood or amount of danger posed by the feared item) relate to what Ledoux discussed. a) Are phobias neurally stereotyped? For example, do they bear more resemblance to learned or innate fear responses? Do they differ based on the nature of the phobia or individual? b) Are they uniquely human? Of course a phobia of an abstract concept requires knowledge of the concept, but do animals justifiably exhibit phobias? Is a dog's intense fear of a vacuum cleaner evolutionarily validated by the fact that loud noises are typically to be avoided? c) Are phobias just a vague category generated by a behavioral definition that bears little relevance to the associated neural phenomena?

Klara Kovarski     19 August 2012 16:54
Professor Ledoux’s point of view seems to be pessimistic. We’ll never know how an animal feels. Is the lack of natural language the only reason? If yes, how could we interpret the neuro-imaging? Assuming that there is the same survival circuit in an animal species and in humans, what does this allow us to conclude about animals feelings? Is having feelings of emotions necessary for attributing emotions to others? Is it sufficient?

Jorge Armony     : Neural Bases of Emotion

Jorge Armony     Neural Bases of Emotion
(video not available)

Abstract: In this talk I will describe the main neural systems and mechanisms involved in the processing of emotional information, highlighting the similarities and differences between species (rats, monkeys and humans). In addition, I will briefly present findings and controversies regarding the interactions between emotion and other cognitive processes, such as attention and awareness.


Comments invited

Posted by Stevan Harnad

20 comments:

Martha Shiell 3 July 2012 14:06
Ledoux highlighted that the distinction between emotion and consciousness is overlooked in emotion research. Fittingly, Armony did not want to talk about consciousness.

Jorge Armony 7 July 2012 08:59
Well, at least I was (somewhat) willing to talk about emotion...

Maxwell J. Ramstead 3 July 2012 14:25
I found it very interesting that the amygdala be involved in processing emotions other than anger and fear—and preferentially so to positive emotions! This entirely reverses my previous logic concerning the amygdala. Come to think of it, though, given its numerous functions and relations to other parts of the brain, it makes sense that the amygdala be a general purpose novelty detector for potentially relevant emotional stimuli.

Jorge Armony 7 July 2012 07:03
Glad to hear you’ve learned something new from the talk! The “relevance detector” idea is nicely described by David Sanders in Reviews in the Neurosciences, 14, 303-316 (2003).

Luiz Pessoa 8 July 2012 07:33
I agree with Jorge that part of what the amygdala does is “relevance detection” (also very nicely described by Paul Whalen in a paper in 1998), but I think it goes well beyond that, and includes attention and value representation (which affects decision making). Some of the ideas are here: [http://lce.umd.edu/publications_files/Pessoa_Neuropsychologia_2010.pdf]

Carey YL Huh 4 July 2012 14:37
A question to Dr. Armony and amygdala researchers: if amygdala is activated by so many different emotions (happy, scared, etc.), are they subserved by different individual cells firing, different amygdala nuclei, or is it in the pattern of firing? For example, do we have happy vs. scared emotion-specific cells, or happy emotions are generated when the cells fire in a particular pattern?

Jorge Armony 7 July 2012 07:06
That is a critical question, which is still largely unresolved. There seems to be evidence for the same cells potentially coding different emotions (see Gothard et al., J Neurophys 2007) as well as for different neurons coding different emotions (See Paton et al., Nature 2008)

Nico Sheppard-Jones 29 July 2012 11:49
I am unfamiliar with the literature, but it would seem to me that the amygdala’s differential activations are determined by co-activation with other brain areas. In other words, one might expect the same nuclei to show activation for different emotions, but for each emotion, show co-activation with a different set of brain regions.

Félix Mongeon 4 July 2012 21:38
Ledoux showed that there are different amygdala nuclei which show connections which different brain areas and are thus implicated in different functions. See its paper: Emotion circuits in the brain (2000)

Jorge Armony 7 July 2012 07:07
True, but there is not much evidence to suggest that different amygdala nuclei are involved in different emotions...

Sarah Etezadi 6 July 2012 12:54
In considering whether an emotional response is possible without feeling, I have to say that I don’t think you can be scared (for example) without being at least minimally aware “that” you are afraid. You may not be conscious of “what” you are afraid of (as when you react to something you have perceived subliminally), but you will nonetheless be aware of a certain feeling of, for example, malaise. Without at least the felt-feeling I don’t think we can say that you are scared. Also, the response of the amygdala could simply be an activation in preparation for a potential threat, a possibility supported by the research. I would say that a brain response alone may be a necessary condition for the presence of feeling but is certainly not sufficient. (adapted from original posting June 30 on Stevan Harnad Facebook Page in response to Guillaume Loignan’s question “Can I be scared of something I am not conscious of?”)

Jorge Armony 7 July 2012 07:12
It depends on what you mean by “emotional response”. If you refer to physiological/behavioral responses, then there is evidence to suggest that you can have them in the absence of awareness. If, on the other hand, you refer to the subjective, conscious feeling, then indeed you would need awareness. Not sure what else besides a brain response you would need for the presence of feeling (assuming we’re not dualists...). Although you’re probably right in that a response in one specific part of the brain is unlikely to be sufficient (as the growing consensus is that there is a distributed representation of consciousnesses in the brain, right?)
Inge Broer 16 July 2012 10:35
I was wondering if there was any evidence for people being differentially aware of the response produced by a subliminal image? Are certain people more aware that way? Do you know if this has been studied?

Shady Rahayel 18 July 2012 18:41
Do you think awareness to subliminal stimuli would at some extent be linked to the hypnozability level of an individual?

Inge Broer 31 July 2012 19:27
Oh! Hmm... in the way that they might be better at focusing their attention?
Could be!

Klara Kovarski 18 July 2012 10:45
I'm not a specialist in neuroscience, but I found this talk very interesting, especially because I work on autism. I have a doubt about the stimuli. If I'm right all the stimuli used in this kind of experience are controlled and they are specific to a certain kind of emotion (like fear). Is it possible to state that neutral faces don't cause an amygdala activation? Does exist the complete absence of emotion?

Vincent LeBlanc 23 July 2012 18:46
I would really like to be able to see that talk again, I hope to see the video up soon!

Marjorie Morin 25 July 2012 11:53
Originally posted on facebook
GUILLAUME LOIGNON:
Can I be scared of something I am not conscious of? (Starting another thread to discuss the "is emotional response possible without feeling" re the experiment discussed by Armony where they elicit a response with a hidden stimulus.)

Sarah Etezadi:
I don't think you can be scared without being at least minimally aware "that" you are afraid. You may not be conscious of "what" you are afraid of (as when you react to something you have perceived subliminally), but you will nonetheless be aware of a certain feeling of, for example, malaise. Without at least the felt-feeling I don't think we can say that you are scared. Also, the response of the amygdala could simply be an activation in preparation for a potential threat, for example. I would say that a brain response alone may be a necessary condition for the presence of feeling but is certainly not sufficient.

Marjorie Morin:
I do think like Sarah. When I read Guillaume's post I was thinking about the stimulation of the amygdala. There is no "real" stimulus but you would feel an intense fear anyway, without knowing why. This emotion is very intense and is very conscious even if there is no "real" stimulus that you are aware of. I guess it must be like a panic attack you have when you wake up, you feel the fear, but you don't really know what happened that put you in this state. So I guess you can be conscious of your emotions (you feel them) without being conscious of what elicited them.

Jennifer Robinson 31 July 2012 10:55
I found Dr. Armony's talk very interesting and entertaining! Especially the anecdote about the rat with the lesioned amygdala and the cat! Unfortunately the talk is not available online, I was wondering if anyone remembered if Dr. Armony described if there were differences in the level of activation in the amygdala with different types of emotional responses, do fear and happiness responses elicit a higher level of activation in the amygdala?

Xavier Déry 31 July 2012 11:13
We keep running in the limitations of functional brain imaging, reporting activations for areas way too large to pinpoint function!

Fernando Cervero: Cellular and Molecular Mechanisms of Pain

Fernando Cervero: Cellular and Molecular Mechanisms of Pain
video

Abstract: Pain is a sensory and emotional experience that in humans also has a strong cognitive component. We can identify the elementary neurobiological mechanisms at cellular and molecular level that mediate injury-related responses of the nervous system, yet the link between these mechanisms and the conscious perception of pain remains elusive. The challenge is precisely to identify this link.

http://mitpress.mit.edu/catalog/item/default.asp?type=2&tid=13007

Comments invited
Posted by Stevan Harnad

17 comments:
Morgan Smith  3 July 2012 14:30
Cerven said that the sentient observer must prescribe or attribute the concept of feeling to non-communicating humans or non-human animals. You (Prof. Harnad) mention that a toaster does not feel, but we cannot immediately make that conclusion in the above case. Could not our notion of "feeling" merely be a byproduct of our nervous system, even present in other vertebrates without our knowledge? We as a species constantly attempt to distance ourselves from the rest of the animal kingdom. What right do we have to assume in the negative about such a clearly adaptive function as affective experience as a reinforcement or punishment mechanism?  

Stevan Harnad  22 July 2012 08:07
MECHANISMS
1. Both our feeling and our feeling that others feel is a product of our nervous system.
2. Yes most (perhaps all) animals feel, regardless of whether they can communicate; and toasters don't. (Where does communication stop and mere interaction begin, as between predator and prey?)
3. But it is certainly not an explanation of how and why we feel rather than just do to say feeling is a reinforcement/punishment mechanism:
4. What gets reinforced and punished is doing, and we can already implement such a mechanism in unfeeling robots: What's the feeling for?

Sebastien Tremblay  22 July 2012 15:08
Dr Harnad, on what basis do you confidently affirm that most (perhaps all) animals feel in your proposition #2? If there is one thing I understood of the Turing test, is that there is no way to empirically test your proposition! Perhaps you and others should be more prudent when addressing this issue.

Stevan Harnad  22 July 2012 16:10
PRUDENCE & PASCAL'S WAGER
1. The Turing Test is for robots, not animals.
2. The other-minds problem applies to every other entity but oneself: it does not apply only to nonhuman animals nor only to non-speaking humans or animals
3. Where prudence is needed is not in solving the theoretical other-minds problem (because you know as well as I do that cows, sheep, dogs, cats, horses all feel pain).
4. Where prudence is needed is with snails and lobsters and octopuses, where it is not as obvious that they feel, yet if we injure them, assuming they cannot feel, we do far more damage if our theoretical inference that they cannot feel is incorrect than we do if we do not injure them and our theoretical inference that they can feel is incorrect. (This is a variant of Pascal's Wager.)
5. As we go down the phylogenetic scale, my affirmation is based more and more on prudence than on what is obvious higher up (just as it is more prudent to assume that a person is innocent until proved guilty, rather than the reverse, and along the same lines that it is better to free 10 guilty people than to hang an innocent one...)

Sebastien Tremblay  28 July 2012 09:51
@Stevan Harnad
Thank you for your answer.

Although I agree with the general idea of your proposition #4, I would disagree that the value of "damage", whatever you mean by it, is relative to the quality of "feelings" a creature is alleged to possess. If we found out, per example, that feelings (i.e. consciousness) is solely dependent upon the expression of a gene that only half of the human population is equipped with, would you argue that the death of a human from the other half is less "damage" than the death of a member from the "conscious" half?

Secondly, I would agree that the observation of animal behavior (without any study of their nervous system) would lead one to the intuition that cows, sheep, dogs and cats all have feelings that are hardly attributable to animals like lobsters and octopuses. The problem with this intuition is that it is largely biased by the fact that we, humans, are mammals that share a behavioral repertoire with the first group of animals that allows us to easily project feelings upon them. It is a lot more difficult to do the same type of anthropomorphism with octopuses and lobsters. If I would have to draw a line between feelers and non-feelers, I would certainly restrain myself from concluding anything based solely on this intuition.

I understand your position of "prudence" to be like considering every animal a "feeler", until the proven the opposite, in the scope reducing any absolute value of "damage", just like in our system of justice. Although I agree with the principle, your position should not be oblivious to the fact that we humans attribute higher values to human lives than non-human animals lives (i.e. we would rather save our child, than our dog on a forced-choice scenario), and by extension, to human needs compared to other animals needs. That being said, would you deprive yourself a having a house knowing that building that house would probably result in the death of thousands of ants, worms, plants, birds' habitat, etc.? Would you deprive yourself from eating proteins and nutriments that are part of a healthy nutrition?

If it is not clear that "feelings" is the currency of "damage", and if our attribution of feelings to other animals is based on a biased intuition, I do not see how your position is tenable.

Stevan Harnad  4 August 2012 11:15
THE MEANING OF LIFE
@Sebastien Tremblay

(1) Yes, the death of an "organism" that was just as unfeeling as a teapot would matter incalculably less than the death (or suffering) of a feeling organism.

(By the way, how would we ascertain that your hypothetical gene makes organisms feelingless? If they acted just as if they felt, how would we know? And even if they acted differently, how would we know they didn't feel? [These are mostly counterfactual zombie speculations, not ways of answering substantive questions.])

(2) Lobsters are very different, but I have no doubt they feel: Do you? They're not like us, but close enough to err on the side of mercy. (So what is the point you are trying to make?)

(3) We favor our kin over non-kin. By the same token, we favor our kind over other kinds. But if we are not talking about philosopher's extreme forced-choice koans ("Which one would you save from a burning building?") but about real-life decisions in which the trade-off is much less extreme or balanced, then the answer is obvious:
If it's a choice between dying or eating a plant (even if it feels), eat the plant. With eating animals, there is (in all but extreme cases) no such trade-off: if you eat them, it's just because you prefer the taste, not because you need to, for survival and health.

Your question about the house, and logging, etc. is an ecological one. No, don't freeze in the winter instead of building shelter at the expense of trees and their other users. But how much of the ecological devastation we are wreaking on the planet and its creatures is really a subsistence trade-off like that, rather than the taste for a cushier dwelling?

(We're verging here on the question of the meaning of life. And if you ask, I'll tell you what it is, because I think I know…)

Maxwell J. Ramstead 3 July 2012 14:30
From the perspective of our summer school, I found it of interest to note that certain lobotomy patients, as well as patients using opiates, feel a "numbed pain," as it were, that is to say a sensation "of pain" that is not painful. This dissociation of pain as an experience of suffering could have rather profound implications for consciousness studies. Does this mean that the brain areas responsible for generating the feeling of pain, and the brain areas responsible for the unpleasant quality of the painful feeling, are indeed distinct? What does this imply from a computational standpoint?

Roxane Campeau 12 July 2012 11:34
posted on FB during the talk
Stevan Harnad

Cervero: Nociception is detection/action (doing); pain is feeling.

Roxane Campeau
And according to Cervero, consciousness seems to be the link between detection/action and feeling, which is similar with what I understood from Damasio yesterday: the link between action programs and emotions appears to be what consciousness is (the concert/chorus metaphor).

NICO SJ
Dr. Cervero's talk brought an (arguably...) interesting question to mind: if feeling is "of" consciousness, then does "feeling" less mean one is less conscious? His talk also, for obvious reasons, makes me question the desirability of feeling (and of, thus, of consciousness)

Stevan Harnad
Feeling less means one is conscious of less, not that one is less conscious. Feeling/consciousness is all or none: An entity either feels (as an organism does) or it does not (as a toaster does not). The rest is just about what and how much you feel. The hard part is explaining why you feel anything at all.

Morgan Smith
As for adaptiveness, heartbreak, empathy, and other emotional pain promote prosocial, altruistic, behavior, which serves to strengthen chances of survival at individual and societal levels. Both Jackson and Damasio touch on some of these points, so you could start with them and the links given on the course site: http://users.ecs.soton.ac.uk/harnad/TuringEvolutionConsciousness.html#_edn6

Feeling less means one is conscious of less, not that one is less conscious. Feeling/consciousness is all or none: An entity either feels (as an organism does) or it does not (as a toaster does not). The rest is just about what and how much you feel. The hard part is explaining why you feel anything at all.

NOEM!
Yeah, I guess I really just don't understand why humans evolved to have consciousness/the capacity to feel. That's probably one of the biggest reasons I was so excited to attend this conference—maybe it would shed some light on this question.

It makes sense to me that humans would have pain, in physical terms, because that lets you know that something is off-balance/not right in your body. BUT what really confuses me is the necessity for emotional pain, say, heartbreak. Maybe this just comes as a by-product of the capacity to feel physical pain? I don't know. Does anyone have other ideas? Or can point me towards literature?

Morgan Smith
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Roxane Campeau 12 July 2012 11:36

NICO SJ
Quoting from above: "Feeling less means one is conscious of less, not that one is less conscious." I understand your (Stevan Harnad) point about consciousness being all or none. Point gladly taken. However, what does being conscious of less amount to, specifically? "Conscious of less" makes me immediately think of meditation, but that is incompatible with conscious = feel, since it brings in executive function (which Dr. Tallon-Baudry made clear is NOT consciousness).

Stevan Harnad
Feeling less means feeling less: Turn down the volume, lower the lights and I feel less. But I still feel, And that's what needs to be explained.

Eric Millette
"Feeling less means feeling less: Turn down the volume, lower the lights and I feel less." Do you mean that you feel less compare to the previous state you were in? Otherwise, I'm not sure how I should interpret this statement. And, I'm pretty sure I won't agree with this.

If I lower the volume of my sound system, it's not that my feeling is reduce but rather that the experience I'm feeling is completely different. My experience of the music playing is changed altogether. (It's anecdotal but in some cases - mostly with noise music - artists strongly suggest that you listen to their records loudly.) In a way, I feel less of what the music should feel like (I can't no longer hear some of the details, feel the abrasive texture the composer wanted me to feel at some point); but how is that different from detection? Turning down the volume is simply making me unaware of some aspects of the composition. It's not that I'm feeling less, instead I'm no longer able to detect what was meant to be detected.

30 Jun 13:33 a 1 | juillet 00:36

Stevan Harnad 13 July 2012 08:38

MATTERS OF DEGREE

Detecting is doing, not feeling. Feeling is felt detection.
You can feel fewer things, or feel them less intensely, just as you can see fewer things, or see them less clearly or brightly. What is not a matter of degree, though, is whether you feel anything at all.

Feeling itself (i.e. that you are feeling, not what you are feeling) is all-or-none: no degrees, like intensity.

Or, if you like, it is like a threshold, but not a detection threshold (which concerns how intense a stimulation must be to be detected) but a threshold below which there is no feeling at all (a teapot, a toaster). At moments when that happens (perhaps in delta sleep), we are not there. It is not that we are feeling what it feels like to not-feel (that is self-contradictory), but there is simple no feeling going on at all.

Is it clearer now what is all-or-none?

Noemi Stern 15 July 2012 18:08
Cervero briefly mentioned in his talk that we are only aware of certain external realities - some specific light and sound waves, but that we are completely unaware of the electromagnetic waves that are present around us (cell phones etc.) - however that these waves are just as real as the ones that we can sense. If we assume that humans evolved to be aware of certain things because it was evolutionarily advantageous for us to do so, do you think we would ever evolve to become aware of these waves if they are indeed as cancerous and harmful as many have suggested?

Inge Broer 16 July 2012 10:50
Hmm... well the evolutive processes would work if let's say such waves made us sterile or killed us before we had the chance to reproduce, but only if some of us were able to escape the harmful radiation by detecting it and steering clear of it.

What seems more likely is that we'll pay more attention to it and develop technology to measure such radiation.

But to me, this was an extremely interesting point (but I'm not sure why it's interesting...). We, humans, have good eye sight, hear well, and smell taste and feel touch alright. So that's the kind of information we're processing all the time, that's what we go on to make decisions, etc.

I think the combination of sight and hearing is especially important for us because it allows us to situate ourselves in time and in space. This would allow us to make more complex decisions that other animals are not forced to make as MacIver demonstrated so elegantly with the fog analogy.

For me, it brought to light that if we're to define consciousness and to deliberate whether machines or other animals have it, it is important to recognize what kind of information different senses bring in and what kind of elaboration it allows.

Thierry Laurion 21 July 2012 10:08
As said on facebook, does this theory brings something more then the portillon (gate control of pain) theory?


http://thebrain.mcgill.ca/flash/a/a_03/a_03_cla/a_03_cldou/a_03_cl_dou.html

Natural intuition makes us rub the skin where pain is felt. This stimulates big fibers which modulates pain perception. Bottom-up pain modulation mechanisms.

Expectations mediates our attention the same way. Telling a child that a puncture is going to go well + making him talk about what he did this morning, or making him focus on his joy of the day will also modulate pain perception. Top-down pain modulation mechanisms.

Alexandre Duval 26 July 2012 15:34
In his talk, Dr. Cervero assumed that pain has two components: a psychical adjunct (consciousness) and a protective reflex (nociception). His description of the processes involved in nociception were really informative, but I wonder whether being in pain necessarily comes with the psychical adjunct. Could there be pains that are not phenomenally conscious? For instance, suppose that I am sleeping - but not dreaming - and someone puts my hand on a slowly-heating object. If I am not mistaken, I should normally exhibit typical pain behavior in such a case: at some point, I will move my body away from the source of harm and I might cringe a little bit too. Do I count as being in pain? (Peter Carruthers defends a similar view concerning non-conscious pain in his 2000 book on consciousness.)

Stevan Harnad 5 August 2012 18:12
More likely: the burning will wake you up...

Xavier Déry 31 July 2012 11:14
Again, "We don't know" a lot, but to me it indicates honest, sound science. 'Not knowing' now can be on the way of finding out.

Phillip Jackson: The Brain Response to the Pain of Others: Fleeing Versus Caring

Phillip Jackson The Brain Response to the Pain of Others: Fleeing Versus Caring

video

Abstract: The subjective nature of pain makes its communication from one person who is suffering to another who is observing quite a challenge. Accurate perception of others' pain relies on different behavioral and neurophysiological mechanisms, which can vary depending on individual, relational and contextual factors. This talk will discuss evidence showing how the perception of pain in other individuals is related to patterns of brain response similar to those found when people are in pain. While this 'shared representation' of pain, which can automatically trigger an aversive response in the observer leading to avoidance, has likely played a key role in the species' survival, we posit that other regulatory mechanisms can override this response to allow for concern and prosocial behaviour to emerge towards the person in pain. This conscious act of empathy has no doubt contributed to our social nature.


Commentary invited

10 comments:

Carey YL Huh 6 July 2012 14:20
If I remember correctly from Dr. Jackson's talk, pain-insensitive people show activation of some brain areas (indicated by a BOLD signal?) in response to watching another person undergo painful stimuli. Were these areas the same as those activated in pain-sensitive normals in same situations, such as anterior cingulate and insular cortices?

If this was so, I wonder what the explanation would be, because I would think that the phenomenology of imagining pain in other people depends to some extent on our own experience of pain. So, if the pain-insensitive subjects show the same areas/strength of activation, it would follow that knowing what pain feels to oneself has not much to do with imagining what pain must feel like to other people, which doesn't make sense to me intuitively.

Philip Jackson 9 July 2012 07:36
Hi,
The brain imaging study you are referring to is Danziger et al, Neuron, 2009 (see also Danziger et al., Brain 2006 for a prior behavioral study). This experiment indeed suggests that people with congenital insensitivity to pain (CIP) show a similar pattern of brain activation (including changes in anterior mid-cingulate and opercular-insula cortices) than healthy controls. One further finding from this paper is that CIP patients showed a positive correlation between trait empathy (measured with self-report questionnaires) and ventromedial prefrontal responses. A pattern not found in the controls. The authors suggest that other mechanisms such as perspective taking (as opposed to somatosensory/affective resonance – which is likely more experience dependent) can lead to this pattern of activity during the observation of other people’s pain.

Phil J

Laurence Dumont 29 July 2012 17:18
I am wondering if such findings can only be generalized to pain. Have you done any study involving pleasant emotion using similar stimuli (ex. hands holding a smiling baby or putting a fork in a delicious looking cake), I think that the discrepancies between first and third person response would differ to a similar extent and would really be interested in knowing if empathy in the positive is as powerful.

Inge Broer 31 July 2012 19:29
Ohh yes! I would love to know the results to a study like that.
Brain responses to pain and emotion aren't always that far off from each other.

Izabo Deschenes 1 August 2012 00:04
Agreed!

Alexandre Duval 30 July 2012 13:22
I was particularly interested in one of views discussed by Dr. Jackson in his talk, namely that empathy (in particular the ‘regulation component’ which involves what he calls a ‘prosocial attitude’) might have been facilitated by pain resonance. One of objection to this view, as he mentioned, is that even people who suffer from congenital insensitivity to pain (CIP) can assess other people’s pain and often desire to help others if they think they are suffering. So pain resonance, it could be argued, does not play a role in eliciting the prosocial attitude. I do not find this objection convincing however. It seems that the ability of CIP people to assess other people’s pain might well be the result of learning (either explicitly when their family and friends provide them with information such as ‘If you see someone winces in this way, that means he is not comfortable’ or implicitly if they notice which kind of behavior people exhibit when they say they are in pain). If it is the result of learning, it would suggest that a community of people who did not have the pain resonance mechanism would not have been able to assess each other’s pain at all and help each other accordingly. Thus, it seems likely that they would not have displayed empathic responses.

Jennifer Robinson 30 July 2012 13:52
I found Dr. Jackson’s talk very interesting, particularly the data he showed with people who score at higher levels of the psychopathy tests as well as people with congenital insensitivity to pain. He also mentioned briefly that there are studies which examine responses with parent/child relationships. While it would seem logical that an emotional connection to the individual experiencing pain would result in a higher empathetic response, I was curious if there is any studies which has examined the differences in the pain perception in children vs. adults?

Nico Sheppard-Jones 31 July 2012 13:15
To what extent is cognitive machinery necessary for perception of pain? The authors in the Danziger 2009 paper referenced above by Dr. Jackson dissociate ‘pain sensation’ from ‘pain cognition’ and ‘pain emotion’. CIPs are assumed to have no ‘pain sensation’ because their pain fibers are either lacking or abnormal. For these authors then, ‘pain sensation’ is equivalent to noception. We can extend these thoughts to broader questions about ‘feeling’, and ask: is noception a type of feeling? If not, then what cognitive machinery (if any...) is required for feelings to arise? Answers to these questions might help answer the Distribution Question - what animals besides humans feel/are conscious?

Izabo Deschenes 31 July 2012 19:40
If we assume the person in the scanner who is looking at expression of pain is `feeling' and not only `doing', and we can measure or quantify their feeling by brain activation, would there be any equivalent test we could perform to evaluate if a robot is experiencing that same `feeling'? If one succeeded the Turing test, is there currently any way to measure or know if the robot is feeling empathy for example? To pass the Turing test, would a robot have to demonstrate empathy, at least behaviourally?

Finally, (had this question on the day of the talk in my notes and completely forgot to post it) just to clarify, as in many studies shown in Phillip Jackson's talk, where people are in scanners and shown images of other people experiencing pain, though passively watching and `feeling' with/for the person, the brain activations observed are part of the `doing category'? (Because they are observable by the researchers)

Stevan Harnad 2 August 2012 17:02
Brain activity is doing. What we measure when we measure brain activity is doing. Yes, the person is feeling too, and the brain activity (doing) is correlated with the feeling, but what we are measuring is not the feeling. (And the question is: how and why is feeling correlated with that brain activity?)

Catherine Tallon-Baudry  : Is Consciousness an Executive Function?

Catherine Tallon-Baudry  Is Consciousness an Executive Function?

Abstract: In many theories and experiments, consciousness is conceived as an executive function, that distributes precise and detailed information guiding behavior. Indeed, the neural mechanisms correlated with consciousness share a number of similarities with those involved in executive functions such as attention, memory and control, e.g. amplification and selection, engagement of fronto-parietal regions, oscillatory synchrony. This apparent similarity has been challenged by a number of experimental evidence showing partial or full dissociations between the neural correlates of consciousness and the neural correlates of other cognitive functions. Those results suggests that, from a neural point of view, consciousness may be less executive than previously thought. The current brain-as-a-computer metaphor, with neural mechanisms designed to support goal-oriented behavior, may therefore be an insufficient framework to understand the biological mechanisms underlying consciousness.


Comments invited

Posted by Stevan Harnad

18 comments:

Eric Millette 1 July 2012 04:43
It seems to me that Tallon-Baudry is leaving us with two equally unsatisfactory options concerning consciousness: (1) it's nowhere to be found in action and therefore we should be skeptical about it; (2) if we still believe in consciousness then we should start to look away from action (but where?). However, if we do not know, for sure, what we are looking for (we are still undecided on the nature of consciousness) then why should we be surprised when we fail to distinguish neural processes interested in the production of action from neural processes interested in the production of consciousness?

Stevan Harnad 1 July 2012 08:48
It's just yet another symptom of the fact that finding the explanation of what we do and can do does not explain how or why we feel...

Catherine Tallon-Baudry 7 July 2012 14:21
I do not fully understand your point: you seem to imply that I showed that the neural processes involved in action production and the neural processes involved in consciousness production could not be distinguished. My point was precisely to show that the neural mechanisms of attention are distinct and independent of the neural correlates of visual awareness.

Eric Millette 1 July 2012 18:54
Part of the tension/confusion may be attributed to the fact that part (if not all) of what we feel is acquired in similar ways as all we can do. The richness of our felt/conscious life is not magical, contrary to what Graziano thinks; even if it is for some ill-informed people. However, I think he is right when he insists on the necessity for shared knowledge (or feeling). Because our felt/conscious life would not be so rich if it wasn't for the contribution of others (beginning with our mother). As Dewey once said: "And babies owe to adults more than procreation, more than the continued food and protection which preserves life. They owe to adults the opportunity to express their native activities in ways which have meaning. Even if by some miracle original activity could continue without assistance from the organized skill and art of adults, it would not amount to anything. It would be mere sound and fury." Without this acculturation, we could not individually do all we can do; but in my view, we could not individually feel all we can feel.

Moreover, like you suggested at the end of your conference this morning, if feeling is necessary for our valuations (and all behaviors depending on such valuation, beginning with politics) than we may have an idea (still in need of precision) of why feeling is a useful evolutionary adaptation.

Stevan Harnad 2 July 2012 04:00
What social experience do organisms have to have, or to have had, in order to feel pain?

Félix Mongoose 4 July 2012 21:41
I find it highly problematic that Pr Tallon-Baudry operationalized attention as reaction times instead of reaction times and response accuracy primarily because they both are influenced by attention and also because prior research on attention has used both variables (changing operational definitions makes linkage between findings more difficult).
Attention can both shorten RTs and improve accuracy, with sometimes a speed-accuracy trade-off. Because accuracy is often at ceiling, the shortening of RTs is usually considered a reliable index of attentional processing. Besides, there is little doubt that attention is manipulated in the Posner task we have been using, as demonstrated by numerous studies. Another argument, developed in Wyart & Tallon-Baudry J Neurosci 2008, is based on the lateralization of alpha-band suppression, a phenomenon known to reflect attentional orienting.

It is interesting to see how different speakers had such different ideas of what consciousness is, and how to measure it. I found Dr. Tallon-Baudry's dissociation between attention and awareness particularly striking.

I wonder what it would feel like to orient attention to the blind field in the case of Patient GY (with unilateral V1/V2 lesion and Type 2 blindsight)? (e.g. I am not consciously aware of that part of my visual field but I am going to try to pay attention there?)

I found Dr. Tallon-Baudry's dissociation between attention and awareness particularly striking.

We are aware as long as we pay attention to what is felt. But a feeling that is not felt because we do not pay attention to it doesn't mean that it doesn't exist because it didn't technically reached the level of consciousness. For instance, if you are extremely concentrated (if you put all your attention on a single objet because its appears to be extremely relevant for your survival for instance), you won't "feel" the minor other feelings that you would have noticed otherwise if your attention was not focused on that specific situation. But would selective attention be the answer to the function of consciousness and would it be the way consciousness drive our behavior?

I've been trying to reconcile it with the experiments presented to us by other speakers. In a way was the task with the error that pointed either to or away from the future target a bit like the priming tasks Lau and Haggard presented? In a way manipulating attention to go one way to examine if responses (as measured by time or accuracy or even sentiment of agency in Haggard's case) changed when the prime and target were consistent vs inconsistent.

I have two questions about the relation between attention and consciousness, both based on a definition issue. First, are automatisms a kind of unconsciousness attention? Secondly, if there are a lot of different kinds of attention, are there also different kinds of consciousness or just different interactions between attention and consciousness?

I think attention and consciousness are hard to separate. It is not for nothing that some studies use a certain task to study attention and others use the same task to study consciousness. I feel both can be studied as a 'state' or as a kind of phenomenological experience.

Is there consciousness without attention; is there attention without consciousness?

What do you mean by the claim that consciousness can be studied as a state as opposed to a kind of phenomenological experience? Consciousness (in the sense we are interested in the summer school) just is phenomenological experience. Also, Dr. Tallon-Baudry explicitly stated that, according to her findings, there is consciousness without attention and attention without consciousness. Consciousness without attention occurred when the subject reported being conscious of a stimuli (by choosing 'seen'), but the stimuli was in an unattended location (and the reaction time was thus lengthened). Attention without consciousness occurred when the subject attended to the place where the stimuli appeared (and his reaction time was shortened by doing so), but reported not being conscious of the stimuli (by choosing 'unseen'). Moreover, she found neural correlates in the occipital lobe that correlated with attention and consciousness separately (oscillations at around 60Hz for attention and around 80Hz for consciousness if I remember correctly).

I agree that Dr. Tallon-Baudry's experiments were elegant, but we have to be careful about what exactly she was dissociating. In your second paragraph, you mention...
the distinction between "attention and consciousness". But can we really equate consciousness to visual awareness (which is really what she was investigating)? I think not. In any state of wakefulness, a person will be aware (conscious/feel) of something. Visual awareness is just one type of modulation that the overarching 'feeling' system is sensitive to.

Xavier Déry  31 July 2012 11:16
I still entertain some hope that the speakers will collectively contribute to a good definition of attention and consciousness...

David Edelman : The Octopus as a Possible Invertebrate Model for Consciousness Studies

David Edelman.  The Octopus as a Possible Invertebrate Model for Consciousness Studies

view video PDF simultaneously for talks + figures

Abstract: Among all invertebrates, the coleoid cephalopods—that group of molluscs which includes octopuses, squid, and cuttlefish—have by far the largest and most elaborate nervous systems. In addition, these animals have eyes that in many ways resemble those of vertebrates, albeit with some notable differences (e.g., one type of photoreceptor, no retinal ganglia). Moreover, the coleoid cephalopods—particularly the octopus—appear to be capable of both seeing moving objects such as predators and prey at reasonably great distances and executing a variety of adaptive behaviors in response to what they see. Such observations suggest: 1) the presence of relatively sophisticated visual processing, i.e., neural circuitry that can support dense visual input; 2) the possible specialization of sub-modal visual areas in the central brain, perhaps analogous to the vertebrate case; and 3) spatiotemporal properties of memory that would necessarily involve rapid integration of visual information into a dynamic 'scene'.

Here, I will argue that, on neuroanatomical, neurophysiological, and behavioral grounds, the octopus in particular represents an excellent model for investigating the possibility of conscious states in an invertebrate. In making this argument, I will: 1) lay out a working definition for consciousness that may be extended beyond the vertebrate case; 2) describe structural and functional properties which may be the sine qua non of sensory consciousness; 3) suggest evolutionary trends (e.g., the emergence of complex vision) that may have set the stage for the advent of conscious states in a variety of phyla; and 4) discuss my ongoing work and offer a 'roadmap' for additional experiments that could lead to a robust methodology for the explicit investigation of sensory consciousness in these, and perhaps other, invertebrates.

Identifying Hallmarks of Consciousness in Non-Mammalian Species
Criteria for consciousness in humans and other mammals
Animal consciousness: a synthetic approach
Gerald Edelman "Wider than the Sky: The Phenomenal Gift of Consciousness"
http://www.thedivineconspiracy.org/Z5244Q.pdf
http://www.octopus.huji.ac.il/site/articles/Hochner-2006.pdf

Comments invited
Posted by Stevan Harnad

24 comments:

Telencephalon  30 June 2012 15:17
Dr. Edelman's examples of octopus behaviour were fantastic, and his stance that octopi share certain hallmarks of conscious activity are certainly striking. One example, however, seemed to point to a hard-wired, innate reflexive system of vision/action, rather than conscious 'thought' per say: his octopi subjects were able to recognize both CGI and dot-animated crabs as real crabs, carrying out their 'crab-attack' on these crab-like forms, just as they would for any other real crab prey.

While Dr. Edelman used this to illustrate a complex visual recognition system, I believe this points to a rather more primitive representation of prey. The octopus has no stored visual memory of a crab - just a rough program wherein a crab-like form, or crab-like movements trigger the attack response.

As humans, we recognize a dot-drawing in a roughly human shape is being sembant of a human, however we would never approach this dot drawing and try to have a conversation with it (or attack it for that matter...), as we have access to the higher order knowledge of what constitutes a 'real' human.

These differences seem to point to an entirely different mechanism of representing 'other' in the octopus.

But, as was mentioned in the discussion panel today, it is important to form non-anthropocentric definitions of consciousness, and accommodate species-specific definitions of consciousness where needed.

Vincent LeBlanc  30 June 2012 16:09
I believe that Thomas Nagel's "what it is like" to be a given being/organism could be endorsed as a sufficient condition for a being to be considered as having phenomenal consciousness. If there is something it is like, subjectively, to exist, or to act in a particular way, or to perceive the crab (in the octopus'case), then we would be talking about phenomenal consciousness.

The great advantage of this definition is that it is not anthropocentric (every being can have its own way of feeling "what it is like" to be itself, as long as they have one). Saying that in order to count as being phenomenally conscious a being just has to have something it is like (to himself/herself) to be in such a situation, doesn't seem to involve any form of species chauvinism.

This of course doesn't solve all the problems (in particular epistemological problems about how to know whether there is something "it is like" for an octopus to see a crab - it could be an octopus zombie!), but at least seems to be a relatively safe definition of what phenomenal consciousness is.
Describing the study: that polarizing vision offers a sensory channel allowing subtle contrast discriminations that map to fine color differences. Here's a link to a Scientific American blog.

Octopus camouflage and its attendant color- and texture-matching attributes certainly present a puzzle. There is a recent study, published in Current Biology, that suggests that even possible considering octopuses are color blind.

Frédéric Beaudet suggests that in this case, social learning is an epiphenomenon of some other cognitive processes. But I don't think Edelman was not claiming that it was, I ask: what environmental pressures favoured social learning in an organisms that is solitary? Since I can't think of any, I I agree with Stevan when he suggests that Nagel's "what it is like" could be better understood as "what does it feel like".

Edelman commented that it was interesting that octopuses sometimes demonstrated social learning in a laboratory setting. If we find that this is true social learning (I realize Edelman was not claiming that it was), I ask: what environmental pressures favoured social learning in an organism that is solitary? Since I can't think of any, I suggest that in this case, social learning is an epiphenomenon of some other cognitive processes.

As long as there is something it is like for a bat to feel "qua" bat (say - via its echo-locatory senses), that bat is "bat-like" conscious. Similarly, as long as there is something it is like for a human to feel "qua" human, she is "human-like" conscious. And so on and so forth. Any being for whom there is something it feels like to be such being - following Nagel's definition - is conscious.

Prove that there is something it feels like for Dan's and Brooks' robot Cog to exist and I'll acknowledge it is Cog-like conscious (phenomenally conscious in its own manner, which will probably depend on its embodiment characteristics and so on...).

I think that you [and Stevan] are definitely charting the right path here. Though I'm ambivalent at best about David Chalmers' take on Qualia (I believe that he might be confusing the properties of non-iconic, linguistic descriptors—which are very far removed indeed from sensory input—with the actual discriminations [or qualia] themselves), I'm certainly down with the idea of feeling being essentially the basis of phenomenally conscious experience. But, I'm still turning this around in my own mind...

Edelman remarked that it was interesting that octopuses sometimes demonstrated social learning in a laboratory setting. If we find that this is true social learning (I realize Edelman was not claiming that it was), I ask: what environmental pressures favored social learning in an organisms that is solitary? Since I can't think of any, I suggest that in this case, social learning is an epiphenomenon of some other cognitive processes.

Certainly, the position of most ethologists (and nearly all cephalopod researchers) is that social, or observational, learning would necessarily have appeared exclusively in social species. This is an understandable adaptationist position, i.e., many, if not most, behaviors evolved as a result of strong selection pressures imposed by ecological shifts. But, this popular view does beg two questions: 1) could observational learning be an epiphenomenon (as you suggest)? and 2) do we know enough about octopus behavior to be sure that species such as vulgaris (in which Florits and Scotto reported observational learning) are entirely social. Certainly, there is some anecdotal evidence (and, I believe, an ongoing study of animals in the Bay of Naples) that suggests a degree of sociality that was previously unknown. And I wouldn't dismiss the possibility that observational learning is an emergent property. So, I guess the jury is still out. :-)

When I set up my lab at Bennington College this coming Winter (I'll be leaving The Neurosciences Institute and TSRI and joining the faculty at Bennington next Fall), this is one kind of question I'm really keen to address. Though I can't promise any findings along these lines as soon as next year (or even by 2014, for that matter), please do stay tuned! The vertical lobe certainly makes a fair point: the reactions of octopuses to the presentation of an actual crab or a CGI 'simulacrum' may simply be hardwired, optomotor responses. The case of the point-light crab, which was devised for the 'perception of biological motion' experiments, is almost certainly an instance of a response that is also hardwired (as are examples drawn from the vertebrate literature), albeit somewhat different in nature than the other cases. But, the point of these examples was not to provide evidence of consciousness in the octopus, but rather, to demonstrate the efficacy of a psychophysical approach in investigating the properties of visual perception. In the future, such an approach could fruitfully be extended to experimental designs relevant to the investigation of consciousness, i.e., an 'attentional blink' experiment or the like. Along these lines, he combination of a video-based psychophysical approach with multi-site LFP recording in a free-behaving octopus would be quite potent indeed.

This lecture was fascinating. I'm concerned with embodied cognition and octopus seems like an all-time enacting champion. How exactly does it feel to be an octopus?, great question... How does it interact with its environment considering his alien-like nervous system? is another. I was thinking about the camouflage and I wonder how's that even possible considering octopuses are color blind.

David Edelman Octopus camouflage and its attendant color- and texture-matching attributes certainly present a puzzle. There is a recent study, published in Current Biology, that suggests that polarizing vision offers a sensory channel allowing subtle contrast discriminations that map to fine color differences. Here's a link to a Scientific American blog describing the study.
Stevan Harnad : How/Why Explaining the Causal Role of Consciousness is Hard

Stevan Harnad  How/Why Explaining the Causal Role of Consciousness is Hard

VIDEO

Abstract: There are two things that cognitive science needs to explain: (1) How and why organisms can do all the things they can do and (2) how and why organisms feel. Explaining doing -- Turing's problem -- has been dubbed the "easy" problem (though it's no easier than other problems in biological science, and we're nowhere near solving it). Explaining feeling has been dubbed the "hard" problem. The reason it is hard is that feeling keeps on turning out to be superfluous in any causal explanation of doing.

85 comments:

Malcolm MacIver 1 July 2012 06:56
I wonder if you give Turing too much credit for having thought of that, however. Embodiment seems to have been quite outside his concern. Verbal doing yes, but not behavior in the world. You cast it as an accident of him not wanting the obvious appearance of robots to throw things off. But is there any evidence he thought that imitation would be usefully extended beyond verbal competence?

Stevan Harnad 1 July 2012 08:19
You are right to ask. I have no evidence. It's just because it's such a trivial point that I have difficulty imagining that it was not obvious to him.

Malcolm MacIver 1 July 2012 09:54
I just checked the 'Computing Machinery' paper and he does at least countenance outfitting machines with sense organs (last page of the paper):

We may hope that machines will eventually compete with men in all purely intellectual fields. But which are the best ones to start with? Even this is a difficult decision. Many people think that a very abstract activity, like the playing of chess, would be best. It can also be maintained that it is best to provide the machine with the best sense organs that money can buy, and then teach it to understand and speak English. This process could follow the normal teaching of a child. Things would be pointed out and named, etc. Again I do not know what the right answer is, but I think both approaches should be tried.

I think, however, the idea that embodiment, and our specific embodiment, is important is a relatively recent idea, and one he probably would have had difficulties agreeing with.

Stevan Harnad 1 July 2012 11:47
Yes, I remember the part about adding sensor/effectors, but once that's allowed, other dynamic components are possible too. Turing "may" not have anticipated embodiment -- or maybe he did, judging from his work on growth and morphology...

Diego Mendoza-Halliday 1 July 2012 06:59
Dr. Harnad defines consciousness as feeling. If consciousness is all about the feeling, then it's not really defined by the doing, by actions. Therefore, the Turing test is extremely limited, because it assumes a definition of consciousness based on action and not on feeling. For example, locked-in syndrome patients are thought to be conscious, but they don't show any actions. The turing test would fail to categorize that persons as conscious. Likewise, assume hypothetically that I could indeed create a robot that has all the networks necessary to feel, but one that does not interact with the external world, just like the locked-in patient. The Turing test would fail to categorize this robot as conscious. Inversely, I can generate a series of millions and millions of paper instructions of what to say in response to every question possible that can be asked in the turing test (which is a finite number). Just papers saying IF you hear this question, THEN say this. The turing test judge may not be able to know that the entity on the other side of the wall is just a bunch of paper instructions, and may categorize that bunch of papers as conscious. A complete test of consciousness should be one in which, by looking at the hardware alone, one would be capable of knowing whether that hardware at work will generate feeling, in the presence or in the absence of action.

Stevan Harnad 1 July 2012 08:27
The Turing Test is primarily about creating a model that can do "everything" a healthy normal human being can do, not just what a locked-in syndrome patient can do, which would teach us nothing.

The T3 is not a test of consciousness. It is a test or performance capacity (doing). Turing's argument is that if you can design a robot that can pass it, so you cannot tell it apart from a real person, then you have no better (or worse) reason to believe or not believe that the T3 feels than you have with a real person.

This is called the other-minds problem.

Roberto Gulli 26 July 2012 05:54
I agree with your point that the T3 is not designed to be a test of consciousness; to say this is a misunderstanding of the T3 itself. In lieu of this though, one can rightly question the utility of the T3 at all, aside from a purely hypothetical exercise. Wouldn't be we much better off trying to define tractable properties and processes of consciousness (as Searle, Dennet, etc. have attempted), which can then be applied to the situations above in place of the T3? Why must we stress the importance of the T3 at all, if it moves us no closer to answering the questions which remain unanswered?

Sebastien Tremblay 28 July 2012 19:19
@Roberta

Well, if you have no reason to doubt that a T3-passing machine does indeed feel, and if feeling = consciousness (according to Harnad), then T3 could be considered as a phenomenal consciousness test.
“survival of the good enough” instead of “survival of the fittest” comes to mind.

I think Dr. Harnad mentioned that if a particular feature appeared during evolution, and if it has remained, then it must have an adaptive function. This makes sense if the appearing features are either adaptive or non-adaptive. But what if a certain trait emerges and is neither adaptive or non-adaptive—a fluke. This trait could be passed on from one generation to another, even though it has no adaptive function. Maybe a trait doesn’t have to be adaptive to remain, perhaps it just needs to not be non-adaptive. The phrase “survival of the good enough” instead of “survival of the fittest” comes to mind.

Each of us knows exactly what it feels like to feel. No need for definition there. What’s missing is a causal explanation of how and why we feel.

Yes, there are an awful lot of synonyms and weasel-words for consciousness, creating a lot of confusion—and the false sense of making inroads on explaining consciousness. (That’s why I suggest we give them all a rest and call a spade a spade: feeling.)

Objective, observable correlates of organisms’ doing capacity as well as of feeling are all we ever get. But, in principle, all of doing capacity looks as if it will prove explainable in the usual way. Not so for feeling.

And the “hard” problem is not the other-minds problem (which is that we cannot observe or measure the feelings of others, just their correlated doings, bodily and neural), although the other-minds problem certainly doesn’t make the hard problem any easier!

Remember that even if God told us a T3 (or T4) robot really feels, that still would not solve the hard problem of how and why we can do what it can do.

Yes, the T3 is for a generic, normal, healthy, behaving human. A T3 for a paralyzed, comatose person could be “passed” trivially, and would tell us nothing.

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experiences everyday that intimate towards the adaptive usefulness of feeling. I have sex because it feels good, I eat because I feel bad when I don’t, etc. This makes me think, actually - perhaps the primary function of consciousness is to motivate appropriate approach and avoidance behaviour - to guide the animal towards what it needs and away from what will harm it. For without the associated feeling, where would the motivation come from, why would I bother?!

Noemi Stern 20 July 2012 10:42
That's an interesting point, Sarah. If we follow that point you make at the end of your comment, what's to say that animals and plants and all other beings in this world don't have feelings? They definitely follow certain approach and avoidance behaviours and if this qualifies them as conscious, how can we justify killing them and eating them?

Sebastien Tremblay 22 July 2012 14:30
@Noemi : I must disagree with your last proposition : how can we justify killing and eating organisms that feel?
Whether an organism feels or not seems to me as a very bad criterion for making value judgment on what organism we should eat or kill. Firstly, because there is no way (so far) to find out if an organism other than yourself has feelings, and second, because the very fact that we have evolved brains that allows us to have this conference partly relies on the fact that we have evolved a nutrition that is incompatible with this proposition.

Stevan Harnad 22 July 2012 14:58
MOINEAU SANS TÊTE SAUCE CHASSEUR
@Sebastien Tremblay
"Whether an organism feels or not seems to me as a very bad criterion for making value judgment on what organism we should eat or kill."
Well, yes, a serial killer with a time-bomb wrapped around him making his way toward a crowd does feel, but that's a very bad criterion for deciding not to kill him...
But with a feeling sparrow and someone who feels like eating moineau sans tête sauce chasseur, that's not so evident.
If it's ok because "there is no way (so far) to find out if an organism other than yourself has feelings" then by the same token you can eat your neighbour.
And if it's ok because "we have evolved a nutrition that is incompatible with this proposition" then that's simply incorrect:
We have evolved a nutrition in which we can survive and be completely healthy without eating feeling organisms (and thereby, as a bonus, also able to feed a lot more human beings).

Sebastien Tremblay 28 July 2012 10:26
@Stevan Harnad
Please refer to my last comment on the Fernando Cervero's thread for the issue value judgment towards animals' lives.
Here I would like to add an important precision to my proposition.
You said: "If it's ok because "there is no way (so far) to find out if an organism other than yourself has feelings" then by the same token you can eat your neighbour."
But it is certainly not OK to kill an animal on the sole basis that is has no feelings.
I would not eat my neighbor for a lot of reasons other than the one that he is a feeler.
My initial argument is that we should not make value judgment of the lives of animals on the sole basis of an (biased) intuition that some of them might have feelings. As far as I know, our laws and policies are not dependent on the assumption that human have feelings, and I believe that they would hold even if one day it is proven that consciousness is an illusion.

Stevan Harnad 4 August 2012 10:45
"LAWS" IN A FEELINGLESS WORLD
Yes, of course there could be "laws" in a feelingless world. Robots could have traffic lights, traffic cops and traffic tickets. Maybe they could even "evolve" in a world with bio-zombie organisms instead of feeling ones, if there could be one. Laws (and law enforcement) control doings. They also are doings. Just as computations are.
But who cares? Certainly no one and nothing in a feelingless world. The "laws" would in fact just be "laws of nature," rather like \( F = ma \).
So the hard problem remains: why do organisms in the real world feel? Survival and reproduction just requires that they do what needs to be done to survive and reproduce? How and why are we not just feelingless Darwinian survival machines?
And the only "laws" that matter matter only because organisms feel.

Martha Shiell 3 July 2012 13:25
Harnad believes that feelings fulfill a function, and that is why they have survived natural selection. We are supposed to be talking about what this function might be but I'm not sure that we've gotten many possible explanations so far (besides Damasio and homeostasis).

Stevan Harnad 4 August 2012 11:24
CAUSAL DANGLERS
Actually, I have doubts that it is possible to explain how and why feelings evolved because not only does it look as if feelings are superfluous (biological evolution is about doings) but it also looks as if there is no causal role for feelings as an independent causal force in the world (like gravity of electromagnetism): The four fundamental forces (all doings) are the only causal degrees of freedom we have, and it looks as if they can do any biological job on their own...
Morgan Smith 3 July 2012 14:26
Floreano demonstrated that prosocial, e.g. altruistic, behaviour evolves in the human and other species as an adaptive function for survival of groups, often when inter-related (where the effect is stronger). You equate consciousness with feeling, where feeling seems to act as motivation to perpetuate all levels of homeostasis. Why must we assume that feeling is anything other than this, simply a manifestation of pro-survivalist urges and tendencies that increase biological fitness?

from this perspective, the question of consciousness as perhaps unanswerable and surely not empirically quantifiable should largely disappear. Who are we to judge that, just because we think and feel at a meta-level, we are so different from the animals from which we are often so prone to distance ourselves? When consciousness becomes measurable in its effects, I think so eventually do its causes.

Stevan Harnad 5 July 2012 11:43
Prosociality and maintaining homeostasis are useful -- in robotic simulations as well as in adaptive servomechanisms.

But how and why are they felt?

Romain Vincent 3 July 2012 20:15
I cannot understand anything if I do not use concepts; and a working concept represents indirectly things it does not represent. With the definition of a car, for example, we are able to tell what a car is and what it’s not (e.g. "A car is a vehicle, but not a teapot"). With the definition of "feeling" we do not have the same conceptual counterpart: I’ve never been dead, nor in a coma; I’m not even sure that my sleep is feeling-less! I’m not sure to be able to define properly what a feeling is and what it’s not because I cannot prevent myself to feel. So is it possible to argue that consciousness is feeling if one does not know what the concept of feeling refers to?

Stevan Harnad 5 July 2012 11:49
No one knows quite what having/using concepts (ideas? thoughts?) is (maybe computations, maybe some sort of dynamic process).

But robots seem to be able to do some of what you can do, without feeling a thing.

Our concepts/ideas/thoughts are felt, but how? Why?

Seems like one can generate some (eventually maybe most or all) of our capacities without feeling.

So what causal role does feeling play?

Romain Vincent 5 July 2012 12:33
My point is that nobody knows what non-feeling is. Therefore the notion of "feeling" is incomplete. I can experience the difference between a car and a teapot, but I cannot experience the difference between feeling and non-feeling. From a logical point of view, "feeling" is really weird: experience is like the result of an equation we have no access to and feeling is a constant in the equation itself.

Stevan Harnad 6 July 2012 18:48
You are right that there is something anomalous about the category "feeling" -- or, more particularly, the category "what it feels like to feel" -- because we are unable to sample its complement ("what it feels like to not-feel").

Uncomplemented Categories, or, What is it Like to be a Bachelor?
http://cogprints.org/2134/

Philippe Vincent-Lamarre 4 July 2012 08:32
About the hard problem: the why/how of the feelings. To answer the "why" question, I have seen this reasoning many times: "Could we do this without feelings? If yes, feelings can't be an adaptative advantage for this behavior, or action, and can't explain the "why". But what if we asked "would we do it?". Would we do all these things the way we do them or would we do these things at all without feelings? And then ask ourself what are the adaptative advantage of the "would" vs the "wouldn't".

Stevan Harnad 4 July 2012 08:54
Without feelings, "we" wouldn't be there. Could what we can do be done without feelings? Perhaps not, but if not, it remains to explain how and why not.

Alexandre B. Romano 4 July 2012 12:03
At the beginning of your talk you said that feelings are what make things matter to us. Without feelings, nothing would matter to nobody. My question is: does this conception of feelings implies a conception of the self?

Stevan Harnad 6 July 2012 11:52
Yes, humans don’t just feel, but feel they have a self. I’m not sure whether Aplysia have a feeling of being a self continuing across time. But if they feel at all, they have the full-blown hard problem, just as surely as we do.

And also, even if it’s only “ouch,” things matter to Aplysia too.

Karina Vold 4 July 2012 12:26
I agree that the hard problem is about consciousness, and might even agree that consciousness is just feelings (depending on how that term is then cashed out). But I disagree that intentionality is synonymous with consciousness, or that it is just a "weasel word" for consciousness. I think intentionality in Brentano’s sense is neither necessary nor sufficient for consciousness.
MINDS, MACHINES AND BRENTANO

Stevan Harnad 6 July 2012 18:57

Brentano said that "intentionality" -- "aboutness," or the fact that thoughts and words are always "about" something, they have an "intended object" -- was the "mark of the mental".

What is a "mental" state or process if it is not felt? Just an internal state or process (whether internal to a brain, a robot or a teapot).

The string of symbols that is a sentence in a book, or in a dynamic computer programme, is only "about" something because it is systematically interpretable (by external interpreters like us) as being about something. Their "aboutness" is completely parasitic on the "aboutness" in our heads. (Searle will remind us of this on the last day.)

And that aboutness in our heads is felt. Otherwise it may as well be going on in a teapot.

Karina Vold 7 July 2012 12:34

Yes, Searle distinguishes between original and derived intentionality to overcome these issues, but neither kind of intentionality is "synonymous" with consciousness.

Vincent LeBlanc 5 July 2012 11:58

Stevan holds that there are two things that cognitive science needs to explain: (1) How and why organisms can do all the things they can do and (2) how and why organisms feel. I agree with this view, but I am wondering (provocatively): Would it make sense to ask (2*) how and why do some things NOT feel?

Stevan Harnad 6 July 2012 19:01

Of course the question "how and why do some entities feel some things, sometimes" is intimately related to the question "how and why do other entities manage to do what they can do without seeing."

In fact, "How and Why Do We Feel" is equivalent to "How and Why Are We Not Zombies":
http://www.archipel.uqam.ca/246/1/harnad95.zombies.html

Frédéric Beaudet 7 July 2012 08:57

I like this comparison, it surely rings a bell regarding what we call feeling. The gap between zombie mind and human mind seems to gather a lot of phenomenons related to the "what it feels to be human ?" question. Great thought experiment.

Vincent LeBlanc 7 July 2012 13:45

Stevan says that either (1) there is something it feels like - and thus one is conscious, or (2) there nothing it feels like - and thus one is not conscious.

I agree with this distinction, but for the sake of intellectual interest I will try to be provocative.

Why could we not (at least as a logical possibility) say that (2) "there is nothing it feels like to me", is equivalent to (2*) "it feels like nothing to me"? In this case, it would not be the case that there is no "object" of feeling, but rather that the "object" is an empty set of feelings. This is just a matter of arbitrarily selecting a threshold for what counts as consciousness.

By adopting 2* we could argue that every doing comes with a feeling, just that most feelings feel like nothing. If this were the case, any doing would come together with some feeling.

Then, the question of why and how we have feelings would appear as urgent as that of knowing why and how there are doings.

I'm curious of know what you (and everyone else, of course) thinks about it.

Stevan Harnad 7 July 2012 14:03

WHAT IT FEELS LIKE TO NOT-FEEL X VS WHAT IT FEELS LIKE NOT TO FEEL AT ALL

Not feeling X is not the same thing as not feeling anything at all: There are plenty of things I don't feel -- including things I feel now, and then I stop feeling. The difference between feeling X and not feeling X is easy. The difference between feeling and not-feeling is not only different from this, but it is something we can never know at all (probably does not make sense), because we cannot feel what it feels like to not feel anything at all.

http://cogprints.org/2134/

We know what it feels like to feel. No one and nothing knows what it feels like to not-feel. Not even a teapot.

Vincent LeBlanc 8 July 2012 13:32

My claim was the stronger, namely: There is something it feels like to feel nothing at all (i.e., "feeling nothing at all" is one peculiar kind of quale).

You say that since we cannot feel what it feels like to not feel anything at all, we cannot KNOW the difference between feeling and not feeling.

However, if - for the sake of the argument - you buy my definition, than there is no more such traditional (your) distinction between feeling and not feeling anymore. Thus, there is nothing more that needs explaining; at least not anymore than explaining the difference between what it feels like to perceive the world with human eyes and with a sonar-based system, a feeling that - as that of "nothingness" we cannot feel.

In this view, "non-feeling anything at all" is a quale such as "redness," or any other. Its QUALITY is certainly peculiar, but that is precisely the definition of quale. I don't see any problem there.

You argue: "We know what it feels like to feel. No one and nothing knows what it feels like to not-feel. Not even a teapot."

My would simply be: Nobody KNOWS what it feels like to not-feel, but that does not imply that a vast number of things cannot FEEL what it feels like to not-feel. I take it that having a feeling of "nothingness" and not knowing that seems to be a logically consistent idea precisely because of the QUALITY of that particular
A teapot might not KNOW what it feels like to not-feel, and yet FEEL "nothingness". I agree that this might appear counterintuitive, but I don't see how this is logically contradictory unless you hold that feeling always entails knowing (which, I think, is not the case). (I have not yet read your article, so I apologise if I'm not referring to that here)

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**Stevan Harnad** 11 July 2012 17:23

**THE SOUND OF ONE HAND CLAPPING**

Feeling what it feels like to not feel is a contradiction in terms. I'm afraid that anything, and the opposite of anything, follows from that.

"What it feels like to feel" is a top-sided category, because it is impossible to sample its complement ("what it feels like to not-feel") because its complement is self-contradictory.

Nevertheless the category "what it feels like to feel" is not empty, and this Summer Institute was on how and why its contents got there...

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**Matthew Leavitt** 24 July 2012 15:26

So am I correct in generalizing this debate to the archetypal "a lack of a thing is not a thing"?

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**Stevan Harnad** 1 August 2012 18:33

**UNCOMPLEMENTED CATEGORIES**

No, an uncomplemented category is worse than that. A non-color is not problem: a sound is a non-color, and it's a thing. Absence is a thing; it's complemented by presence, which is a thing. (Things are categories: things we can tell apart.)

But the complement of what it feels like to feel would be what it feels like to not-feel; Not what it feels like to not-feel sad, or not-feel that the time has slipped by. That's not a problem either. The problem is what it feels like to not-feel at all. That's self-contradictory, like what's the color of a colorless thing.

That does not mean it doesn't feel like something to feel. It just means that what it feels like to feel is a category that is likely to have anomalies, because it is not well-instantiated, with positive and negative instances, like most other categories. (Feeling is not the only uncomplemented-category. Existing is another.)

See: "Uncomplemented Categories, or, What Is It Like To Be a Bachelor"
Stevan Harnad: "There is mirror self-recognition with or without feeling. (You can design a (toy) robot to recognize itself in the mirror.) All those other words for consciousness are either exact synonyms for feeling (like experiencing, having qualia, etc.), or they are feeling + something more (felt self-recognition in the mirror, felt sense of self, feelings about having feelings). All other species that feel are conscious, whether or not they recognise themselves in the mirror and whether or not they have a concept of "self" (not the same thing as mirror recognition)."

Pauline Claude: "I don't think I really understand the full meaning of "awareness"... do we attribute the same meaning to awareness in "self-awareness", "body-awareness", other-awareness", and so forth?"

Laurence Dumont: "It would be interesting to see if the equivalent of the TPJ would be similar in animals that can recognize themselves and those who can't!"

Pauline Claude: "Are self-awareness and self-recognition two different things in terms of feelings?"

Stevan Harnad: "Unless it is felt, "awareness of," "consciousness of" etc. all just mean access to some information. And information is just data, unless it is felt. What Dan Dennett should have said about "access consciousness" vs. "phenomenal consciousness" was that there is no "access consciousness": there is only access to information. That information can either be felt or unfelt. If unfelt, then it's just mindless information-processing (i.e., doing). If it is felt, then we have the only consciousness there is, which is feeling (so why bother with the long and redundant synonyms "phenomenological consciousness"? -- But of course that's not what Dan said. Rather, what he said was that there is no phenomenological consciousness. What we mean by consciousness is just access (i.e., just doing, no feeling -- or rather what we mean by feeling is just certain doings -- the "accessible" ones we can talk about...)."

Pauline Claude: "Thanks, I understand much better now! I think the idea of felt and unfelt desires we pay attention to it. Why do we have kinds of data that will never reach consciousness (or be felt) whereas others can reach consciousness? do you think this might have any adaptive function? is there any advantage for the brain to discriminate data that need continuous processing (the unfelt) and those that need to be strengthened in function of the environment by increasing an emotional response caused by an increased attention (the felt)? do you know if this question has already been tackled in the study of consciousness?"

Stevan Harnad: "The hard part is felt information. Unfelt information processing is "easy": Why is it not all unfelt? The adaptive advantage comes from the doing: information-processing is just doing. That leaves the ("hard") question of how/why some of it is felt unanswered."

Yassine Benhajali: "What about this hypothesis: it all about learning, if nothing felt no learning. That's why machine can't learn..."

Stevan Harnad: "Why do you need to feel to learn? (And machines certainly can and do learn.)"

Marjorie Morin: "Question to Steven talk: do you think that feeling (in term of hard problem) is only human?"

Stevan Harnad: "No. I think most organisms (invertebrates, vertebrates, mammals) feel. That's why I'm a vegan!"

Marjorie Morin: "It's hard to tell. Animals understand things does it feel something for them to understand? It's possible. But do they feel for example fear of losing their child, fear of never having sex again I'm not sure. Maybe they're "mind" is just not as complex as ours."

Stevan Harnad: "FEELING PAIN IS FEELING ENOUGH. You don't need to be able to feel the fear of losing a child in order to be able to feel pain."

Marjorie Morin: "JEAN-REMY MARTIN: About the Harnad talk, take the following thought experiment: we can imagine a specific disturbance that would specifically affect all the feelings of someone, however in this case we do not want to say that such a human is now a Zombie. What do you think about that?"

Marjorie Morin: "All the feelings as in all the sensory feelings or do you mean all the feelings like feeling you understand, feeling you believe, feeling you are yourself? If it's what you refer to then why wouldn't you say the person is zombie-like? It's like she is not there anymore! Almost as if she was in the coma?"

Xavier Dery: "Glad to hear Harnad say 'T3 is the goal'. Indeed, the brain having been thrown together by evolution, emulating has to be simpler..."

Nico Sheppard-Jones: "I'm still trying to wrap my head around the implications of equating feeling to consciousness. I think for the most part, this approach is useful, but I am finding some implications troubling."
I am particularly troubled about the implications at the neuronal level. If feeling is an all-or-none phenomena, then presumably instances of feeling (punctuated, e.g., by episodes of deep sleep) share something in common. No matter the nature or intensity of inputs, there must be a shared quality to all our instances of feeling. Would you agree? If so, how then must we envision the relationship between the phenomenological experience of feeling and the neuronal substrate of feeling? Can it be anything other than a one-to-one association, meaning that for any instance of feeling we are likely to activate a same set of neurons? This seems unlikely. I was just curious as to what you hypothesize the neural substrates of feeling look like (one or many?)

Stevan Harnad  5 August 2012 17:19
CORRELATION AND CAUSATION
Regardless of whether feeling has one unique neural correlate or many, the problem is not finding the neural correlate of feeling but explaining how and why it causes feeling (rather than just doing).

(Reminder: both organisms' bodily movements and their neural activities are just doings.)

Nico Sheppard-Jones  9 August 2012 21:59
I am not sure I understand your point. How can answers to the problem not be informed by finding the neural correlates of feeling? The neural correlates of feeling are a form of doing. Yes. But if we are interested in the function of feeling, then it seems natural that loss-of-function experiments might provide important clues to the function of feeling. It seems natural, for instance, that induction of a transient lesion by temporary deactivation of neural activities that are responsible for feeling (the 'doing that generates the feeling'), would yield valuable insights into the 'why' question.

In other words, feeling can't occur without some form of doing (unless one espouses some form of dualism...). The doing is amenable to scientific exploration. The feeling as a subjective experience is not. If we successfully modulate the 'doing that generates feeling', then we will have a chance to learn lots about the function of the feeling.

Stevan Harnad  10 August 2012 03:55
CORRELATION AND CAUSATION
Here is an (invented) example of the kind of neural correlation that will certainly help us understand (and predict, and maybe even remedy) feelings: The finding that neural activity in region R at an early age is predictive of uncontrollable rages at a later age, and that early pharmacological or neurogenetic intervention can cure this. But what this kind of correlation cannot tell is how or why neural activity causes feelings at all.

The question of function/feeling correlation and causation is a very subtle one.

Nico Sheppard-Jones  15 August 2012 08:52
My claim is the following: I don't see how feeling can be anything but a 'special' kind of doing (neural activity). The only (erroneous) reasons we have for doubting this were, I believe, rightly put forth by Searle: that the existence of feeling is apprehended through subjectivity.

Stevan Harnad  15 August 2012 15:56
@Nico
Well, yes, feelings are felt (“the existence of feeling is apprehended through subjectivity”) rather than just done. But explaining how and why they're felt rather than just done is the problem!

Nico Sheppard-Jones  16 August 2012 09:12
You agree that there are two aspects to feeling (“feelings are felt rather than just done”). These can be defined as (i) the 'doing' that generates the 'felt'; and (ii) the subjective 'felt'. (i) is open to empirical investigation since it is brain activity. (ii) is a subjective experience. (i) and (ii) fall in different ontological categories, but there still is a causal link between the two: simply, if there is no (i), then there is no (ii).

If we find the neuronal activity that does (i), and disrupt it transiently, then because of that lesion, there will be no (ii). If feeling has a causal role, then any effects following disruption of (i) will be sufficient to give a function to feeling.

Following this logic, disruptions of (i) could produce a proper zombie. If the zombie acts any differently from a non-lesioned counterpart - or acts in a ways that are obviously harmful to its own survival, then a function for feeling will have been found. Classic loss-of-function experiment.

I am certain you will disagree. Where, in your opinion, does my logic fail?

Stevan Harnad  18 August 2012 05:54
THE LOGIC OF LESIONS I (1 of 2)
@Nico: "You agree that there are two aspects to feeling ("feelings are felt rather than just done")." 

No, I never said anything about "aspects": Feelings are palpably something we feel, not something we do. (And like every other person with common sense, I believe the brain somehow causes feelings, somehow: I just want to know how and why.)

@Nico: "These can be defined as (i) the 'doing' that generates the 'felt'; and (ii) the subjective 'felt'." 

To repeat, "aspects" is either vacuous, or yet another weasel-word, and there is nothing being "defined" here. We each know we feel. And surely the brain causes our feeling: how? why?

(And why the redundant weasel-word "subjective"? Is anything felt that is not subjective? Is there such a thing as "objective" feeling?)

@Nico: "(i) is open to empirical investigation since it is brain activity."

Brain activity is brain activity. And brain activity is doing. No more mileage to be derived from that: We don't know how or why brain activity generates feeling.

@Nico: "(ii) is a subjective experience."

Feeling is feeling (Why all this formalism?) "Subjective" is redundant and "experience" is just another ambiguous weasel-word for feeling.
The four fundamental forces (electromagnetism, gravitation, etc.) are enough; all causes and effects are accounted for (in principle). This “hard” how/why problem is a problem because the causal degrees of freedom have already been fully (and successfully) used up in explaining all doing (the “easy” why). It is precisely this sort of simple, natural causal explanation of how and why a physical system works the way it does that does not work when you are trying to explain how and why organisms feel.

Here is an illustration of how “how” and “why” questions are functionally interchangeable:

Yes, I sometimes use “why” as short-hand for how/why, but as I also always stress, the why is a causal, functional why, not a moral or teleological one.

Stevan Harnad 18 August 2012 05:55
THE LOGIC OF LESIONS (2 of 2)

@Nico: "(i) and (ii) fall in different ontological categories."

What on earth do the weasel-words "ontological categories" add (or mean?) here. Are apples and oranges in different "ontological categories"? They're just different kinds of things. So too are objects and movements: no "ontology," just different kinds of things. Ditto for "abstract" and "concave" (sic). Well, doings and feelings are different too.

The problem is explaining how and why organisms feel.

@Nico: "but there still is a causal link between the two: simply, if there is no (i), then there is no (ii)."

No brain, no feeling. Absolutely correct. (Now how does that explain how and why the brain causes feeling?)

@Nico: "if we find the neuronal activity that does (i), and disrupt it transiently, then because of that lesion, there will be no (ii)."

No brain activity X, no feeling. Again true. But how does that explain how and why brain activity X causes feeling? (Do you think that an explanation of how and why X causes Y just consists of showing that if there is no X there is no Y?)

@Nico: "if feeling has a causal role, then any effects following disruption of (i) will be sufficient to give a function to feeling."

This sounds like a re-statement of the suggestion that an explanation of how and why X causes Y just consists of showing that if there is no X there is no Y.

(part 2 follows)

Stevan Harnad 18 August 2012 05:55
THE LOGIC OF LESIONS (2 of 2)

@Nico: "Following this logic, disruptions of (i) could produce a proper zombie."

Do you think that logic is going to tell us whether or not zombies are possible? Not even the Turing Test can do that! A zombie would be an organism or robot that can do anything a feeling organism can do, so you can’t even tell them apart, but it doesn’t feel.

How does the "logic" of disruptions tell you whether or not there can be a zombie? And how would you tell whether or not something was a zombie?

@Nico: "If the zombie acts any differently from a non-lesioned counterpart - or acts in ways that are obviously harmful to its own survival, then a function for feeling will have been found. Classic loss-of-function experiment."

If the lesion causes the organism to act differently from the unlesioned organism, then you will have shown that the lesion causes a difference in doings. You will not have shown whether or how the brain causes feeling. Even if a patient says "your lesion took away all feeling from my arm," you will just have found a lesion that causes anaesthesia.

No, Nico, the "hard" problem is harder than that – and cannot be solved by "logic" alone.

Roberto Gulli 7 August 2012 17:40
Dr. Harnad, I would appreciate a clarification of your conception of the hard problem. I’ve heard you at times state that the hard problem is a question of how and why we feel. At other times, you state it is simply a question of why we feel. These two versions of the hard problem are very different, and only one of these is consistent with the hard problem articulated by Chalmers and consequently discussed and debated.

For those who may not share the confusion, when describing the hard problem Dr. Harnad states: "I know how to explain all of this stuff... the dynamical stuff... planets revolving, apples falling, neurons squirting, organisms behaving, organisms behavioural competence. Once Turing’s program T3 is over, we will have the answers to all of those. But in what sense will that explain the fact that organisms feel? How do they feel... how is it they can feel at all, and in a sense, even more fundamentally, why do they feel? And that why as I repeat is not teleological... What is the functional role of the fact that they feel." ~23 mins. This version of the hard problem initially includes how/why, and later stresses simply the why. To my best recollection, this how/why description of the hard problem was reiterated in personal conversation, and as a result I believe that explaining the hard problem as how and why we feel confuses two very distinct questions. The how, to me, is simply a "doing" problem, making it a tractable problem that may be experimentally tested and empirically solved; hence it is an easy problem. The epistemic question of why is irrespective of the how (as you’ve stated in your response to Nico above). So why, when explaining the hard problem, do you describe it as a question of how and why we feel?

Hearing a direct clarification of this would very much assist me in understanding your perspectives.

Stevan Harnad 9 August 2012 07:11
HOW AND WHY THE "HARD" PROBLEM IS HARD

Roberto, you’ve conflated the "easy" problem of how and why organisms can do what they can do with the "hard" problem of how and why organisms feel.

Yes, I sometimes use "why" as short-hand for how/why, but as I also always stress, the why is a causal, functional why, not a moral or teleological one.

Here is an illustration of how "how" and "why" questions are functionally interchangeable:

HOW does a thermostat keep the temperature constant? (It turns on the furnace when the mercury drops below the set temperature.)

WHY does a thermostat turn on the furnace when the mercury drops below the set temperature? (To keep the temperature constant.)

It is precisely this sort of simple, natural causal explanation of how and why a physical system works the way it does that does not work when you are trying to explain how and why organisms feel. No such problem -- in principle, though we certainly haven’t yet succeeded in practice! -- with explaining how and why they can do what they do.

This "hard" how/why problem is a problem because the causal degrees of freedom have already been fully (and successfully) used up in explaining all doing (the "easy" how/why problem). The four fundamental forces (electromagnetism, gravitation, etc.) are enough; all causes and effects are accounted for (in principle).
Our grandparent’s intuitive explanation of how and why we feel would have been perfectly fine — feeling is an independent causal force (telekinetic dualism) — would have been just fine as a solution to the hard problem. Trouble is that all evidence is that it is completely wrong.

I don’t see eye to eye with Dave Chalmers, by the way, either on computationalism or the “hard” problem (which Dave named, but certainly didn’t invent!).


Roberto Gulli 9 August 2012 19:07
Thanks, I do believe I can more clearly understand your position. That’s not to say I would accept it as my own, however.

It seems as though you have a conceptual wall up separating “doing/easy” and “feeling/hard”. As you say, explaining all of the neuronal activity of the brain in terms consistent with the four fundamental forces will not explain how we feel. On this point, we fundamentally disagree, though at this time neuroscience does not have to tools to prove your position wrong. I can only provide useful analogies for other natural phenomena which have seemed similarly “hard”, but eventually yielded to the scientific method. Perhaps there will be room to expand on this in the paper.

I intentionally conflate the easy and the hard problems, because I believe that the mystery of the hard problem will dissolve when we fully understand how the brain produces feeling; since feelings are generated within the brain, understanding everything about what the brain is doing when it produces subjective feeling will allow us to explain the hard part of how we feel. To think anything other than this seems vitalist. Only when we explain how we feel will we be able to properly understand why we feel, because then we will be able to define feeling in terms that are more descriptive than the unavailing “everyone knows what it is to feel”.

Stevan Harnad 9 August 2012 20:00
VITALISM VS ANIMISM

Ok, I look forward to your analogies. But to save some time, do look in advance at the prima facie reasons why the vitalism/animism analogy doesn’t work.

The wall (which I certainly didn’t invent) is called the “mind/body problem.” All I’ve done (to clear the air and focus efforts) is to suggest that in reality it’s the feeling/doing (or the feeling/function) problem.

Roberto Gulli 10 August 2012 18:02
Thanks for the link - the discussion always improves when someone is willing to provide prima facie reasons why the vitalism/animism analogy doesn’t work.

The wall (which I certainly didn’t invent) is called the “mind/body problem.” All I’ve done (to clear the air and focus efforts) is to suggest that in reality it’s the feeling/doing (or the feeling/function) problem.

Stevan Harnad 11 August 2012 12:32
EXPLAINING DOING VS EXPLAINING FEELING

My monism (like everyone else’s) is an act of faith: I’m as sure as I am of any other truth about the world that the brain causes feeling, just as it causes doing — but I want to know how and why.

And the trouble is that every how/why explanation turns out to be an explanation of how/why the brain causes doing, not how/why it causes feeling.

The feeling is there, alright, tightly correlated with brain doings. But correlation is not causation, and what we are looking for is a causal explanation.

In fact, it looks very much as if feeling is somehow causally superfluous, even though it is caused by the brain, because no one has a clue of a clue as to how/why all the brain’s doings could not be caused in exactly the way they are caused, without causing feelings too.

So the reason no analogy with previous successful explanations of doings -- whether from astronomy, physics, engineering or biology (including the origins, evolution and nature of life and living organisms) -- gives the slightest reason to believe that the same will work for feelings is that feelings are not doings.

Feelings are different. And although they are no doubt caused (somehow, and perhaps for some empirical or even functional reason) by the brain’s doings, there is not even a hunch of a hunch about the how/why of that “somehow”.

I may be wrong that the hard problem is insoluble. But I doubt that I’m wrong that not only is every proposed solution so far dead-wrong (and obviously dead-wrong) but the special nature of feeling makes all the analogies of prior successes that make people think there’s hope into equally obvious disanalogies, hence equally wrong.

The optimistic vitalism/animism analogy is the first and most common of these hopes: “We had thought explaining life was a ‘hard,’ perhaps insoluble problem, but it turned out to soluble (and not even so hard).” Will explain the mind."

Unfortunately not. There was no further fact of the matter to account for, in explaining what it is to be alive. It turned out to be just doings, like everything else, animate and inanimate. Once all the facts of life were accounted for, there was nothing left. The (dualistic) notion that there was the for an extra “vital force” was not only wrong, but had in fact been obviously wrong from the very beginning: Life is just doing, like everything else.

But with explaining what it is to have (or be) a mind, there is something extra, and that is feeling. And although there must be something the brain does to cause feeling, feeling itself is not doing. So we are left with a hard problem of causal explanation: how and why does the brain cause feeling? What is the causal role of feeling?

We may never be able to answer, but it’s perfectly natural to ask — and to go on asking. (And to keep debunking putative answers that are obvious non-starters ...).

I happen to think that even behind vitalism, the source of some people’s doubt that it could be explained was in fact an implicit animism: They felt that life is different because they assumed that it feels like something to be alive.

Which it does, for all feeling organisms (but not, I dearly hope, for plants!)
Robert Gulli 12 August 2012 18:02
You state your fundamental critique of the life analogy to be that life was always just a bundle of objective properties that have now been fully explained; hence there was no need to worry hard about the problem of life. Life was never more than MRSGREN in good measure. I follow you to this point, and believe you’ve stated this matter admirably, and in terms more eloquent than I certainly could.

I meet your next point with reservation. “... the reason no analogy with previous explanations of doings... gives the slightest reason to believe that the same will work for feelings is that feelings are not doings.” Life was a concept philosophized as something too incomprehensibly complex to be caused be doings; thus life was not believed to be governed by physical laws. However, hermeneutic description of life as a complex integration and interrelation of physical doings (metabolism, respiration, sensitivity, growth, reproduction, excretion, nutrition; all individually necessary but insufficient) yielded a fundamental description of life that was tractable and empirically possible to validate (and has been).

Through a similar process we will understand how feeling is produced; I believe this because we are unsatisfied with the only level of reductionism that we know to be correct (feeling is caused by neural activity), and we know that feeling is not caused by an aphysical psychokinetic force. For this reason, I think the dismissal of any attempt to rely feeling as it's own component parts (some of the candidate models you have pointed to in our discussion on Dr. Baars' talk) on the supposition that hermeneutic proposals are merely corollary and cannot be causative is improper, or at worst counter-productive.

Stevan Harnad 12 August 2012 19:34
THE LIVING/FEELING ANALOGY

@Roberto
Here’s what I think you’re missing:

1) Life was not “hermeneutically described (i.e., interpreted)”\textsuperscript{1}. It was causally (and fully) explained (reverse-engineered). MRSGREN were (some of) the properties to be explained, and biochemistry, biophysics, and physiology causally explained them, with no left-overs.

2) Moreover, MRSGREN (and the rest of life’s properties) always were just doings. So there were never any substantive grounds for supposing there had to be a mystery (other than finding the right physical explanation).

3) In contrast, I have to remind you that feeling is something rather different from MRSGREN (and all other known physical properties): It is unobservable, yet it is real – but the only reason we know it is real is that we are each feelers, and have felt it (if real it can only be sure about oneself).

4) In addition to being unobservable by anyone but the feeler, it also looks as if there is no room for feeling to have any independent causal role of its own, whether functionally or evolutionarily: All doings are explicable without feeling; so feeling seems to be causally superfluous.

5) There was never any property like that in the case of life -- except, of course, feeling itself, which is a biological property of (some) living organisms (and, I suspect, may have been the real underlying reason why people had thought life was special, and inexplicable in the usual way). The mnemonic should be MRSGREN!\textsuperscript{2}

6) You seem to think that not taking hermeneutic interpretations to be causal is somehow improper and counter-productive: I wonder why?

7) Interpretations are not causal explanations: The word that comes to mind, if they are nevertheless taken to be causal explanations, is not proper or productive but credulous! It's natural to want to have a causal explanation for something as fundamental as feeling. And if you don't believe me that a causal explanation may not be possible, that's fine (I'm not sure I believe myself on that); I hope you keep trying. But that does not mean dropping your guard and accepting hermeneutics instead!

Roberto Gulli 14 August 2012 20:18
Thanks for your response. I believe you've well identified where our opinions diverge, and I'll take some time to reflect on your positions.

I'll first address your question from though 6), and I'll try to adopt your language from 1).

Through reverse-engineering, we were able to understand life as a sum if its constituent parts, all of which were doings. I believe our explanation of consciousness will be a similar one (i.e., consciousness is never going to be reduced to activity of a single locus, but rather a sum of its constituent parts, which account for our experiential subjectivity, unity, intentionality, etc.). I know that you don't believe that this explanation of consciousness is at all suitable because it uses ontologically objective processes (brain activity) to describe a subjective phenomenon, but this is one area where our opinions diverge.

If what I believe turns out to be correct (which you have every right to doubt), then to dismiss theories that attempt to explain consciousness through study of its constituent parts (ontologically objective patterns of brain activity, some of which you have listed) would lead us away from answering how consciousness is produced by the brain; hence, I say dismissal of such attempts is improper, or at worst counter-productive.

Roberto Gulli 16 August 2012 08:14
Dr. Hamad, like I've mentioned above, I believe our opinions diverge on the matter of whether explaining all of the brain's doings will explain how we feel, and offer us the key to understanding why we feel.

As a result of the conference, I find myself constantly learning new terms (with all of their esoteric nuance and rigidity) to describe rather intuitive concepts that I had not been previously exposed to as a physiologist.

One of these is property dualism. In my grasp of the topic (informed largely by Chalmers and Searle), I understand property dualism to be the view that mental and material entities cannot be reduced to each other since their fundamental properties are not common; each of feeling and matter is a fundamental property in its own right. This seems to me much like your offer that feeling is not doing, and doing is not feeling.

I'd like to ask whether (if you accept my basic summary of property dualism) 1) you would describe yourself as a property dualist (if some other iteration of this concept, please identify). If so, I'd ask 2) whether you believe there is any evidence to support the inherent supposition of property dualism that feeling is not doing, aside from the obvious fact that we have not yet explained feeling through doing.

Stevan Harnad 17 August 2012 20:17
THE SOLUTION ISN'T ISMS

@Roberto
I have no ontological position or interest, so it would be a waste of time to try to classify my "ism." As far as I'm concerned, the only stuff there is in the universe is matterenergy, as the physicists tell us. But matter and energy do have lots of latent properties, such as those of life, which evolved here on earth. I am sure feeling is one of those properties. All I ask is for an explanation of how the brain generates feeling, and -- more important, because it is a functionalist question, not just about how feeling is caused, but about what functional/adaptive it plays -- why the brain generates feeling.
"Property dualism" – like all the other metaphysical "isms" one can espouse in contemplating the mind/body problem – is completely vacuous. It is just a statement of a belief, with no explanatory power whatsoever. I'm looking for an explanation.

When I say feeling is not doing, I am making a simple empirical, methodological observation: Doings are observable, by anyone, with either senses or measuring instruments. (In addition, there are other, unobservable things – such as (maybe) unbound quarks – whose existence is merely inferred on the basis of what turns out to be necessary to explain other things that are observable. Let's forget about such theoretically driven unobservables, as they are irrelevant here.)

So the doings of matter/energy, including atoms, planets and organisms, are observable, and causally explainable.

Feelings are not observable by anyone except the feeler. That already puts them in a class by themselves. In addition, organisms' doings look as if they will be completely explainable causally without any need for feelings. Yet feelings really are there. So they look causally superfluous. That seems unlikely, since feelings are so ubiquitous in organisms. But then what is their causal explanation, and causal role? (How and why do organisms feel, rather than just do?)

"isms" aren't the answer.

Arnold Trehub 18 August 2012 05:21
Stevan: "So the doings of matter/energy, including atoms, planets and organisms, are observable, and causally explainable."

What is the difference between an observation and a feeling?

Stevan Harnad 18 August 2012 13:23
@arnold: "What is the difference between an observation and a feeling?"

Anyone can observe your atoms but only you can observe your feelings.

Arnold Trehub 19 August 2012 08:58
Stevan: "Anyone can observe your atoms but only you can observe your feelings."

Your answer misses this essential point:

TO OBSERVE IS TO DETECT AND DESCRIBE A FEELING

Descriptions of feelings can be covert (e.g., expressed only within your brain), or public (expressed openly for others to observe). Scientific descriptions are always public descriptions of covert feelings because descriptions derive from observations of feelings. Why should we consider the public description of the feeling of an observed atom to be essentially different than the public description of an observed triangle as in my SMTT experiment?

Stevan Harnad 20 August 2012 07:35
TIME TO INVOKE CLOTURE ON RETINOID MODEL IN THIS FORUM

@arnold

Yes, all observations are felt observations, whether they are observations of the meter-readings on a geiger counter or observations of your own momentary mood. But anyone can read the same geiger counter, whereas only you can read your own mood.

(Please don't about people misjudging their own moods in hindsight, nor about psychophysicists "measuring" other people's sensations. These both miss the point and beg the question.)

And the same question applies to both meter-readings and mode-readings: Why and how does either of them feel like anything at all? (Except that moods, unlike meter-readings, would not exist at all, if they were unfelt.)

You have not given even a clue of a clue to the answer, Arnold, no matter how sanguine you feel about the explanatory power of your retinoid model. All you have done is come up with an interpretation of your model which feels like it squares with what it feels like to have visual experience. Correlations. Without even dwelling on the fact that this is all just visual, I can repeat to you -- but it will do no good -- that all you are doing is hermeneutics (interpretation). You are not even touching the fact that visuomotor function (let alone any cerebral function) is felt, let alone explaining it.

But you still keep making the same point over and over, and I keep ing to it the same way over and over. I really do think it's time to stop now. This is not a forum on the retinoid model.

Arnold Trehub 20 August 2012 10:16
@Stevan

Put the retinoid model aside. I have described what a feeling (any feeling) is like for me. What is a feeling like for you? Have you ever had a feeling that wasn't something somewhere in a spatio-temporal relation to you?

Arnold Trehub 22 August 2012 08:34
@Stevan

You are right when you say "Explaining the Causal Role of Consciousness is Hard". But what isn't described can't be explained. So until you give a description of what consciousness/feeling means for you, it is unlikely that any causal explanation of consciousness, no matter how well it satisfies scientific norms, will satisfy you.

Arnold Trehub 13 August 2012 12:08
IF FEELINGS ARE NOT THE DOINGS OF THE BRAIN, WHAT ARE THEY?
Stevan: "... feelings are not doings."

On what principled grounds do you make this flat pronouncement?

I counter with the claim that feeling (conscious experience) must BE a particular kind of brain activity. I have detailed a theoretical model of the kind of brain activity that constitutes feeling (autaptic-cell activity in the brain's retinoid space). I have tested the implications of the retinoid model in experimental trials. The results of the experiments support the retinoid model of feeling. Previously inexplicable instances of feeling are also predicted/explained by the neuronal structure and dynamics of the retinoid model. Do you believe that the retinoid model is not a credible candidate theory of feeling only because you believe that "feelings cannot BE brain activity"?
I do not believe the retinoid theory of feeling because it is not a theory of feeling, it is a theory of "perspectival/volumetric" doing. Dubbing perspectival/volumetric doings "feeling" is just interpretation, not causal explanation.

Arnold Trehub  15 August 2012 08:45

Stevan: "Dubbing perspectival/volumetric doings "feeling" is just interpretation, not causal explanation."

Yes, but providing the essential details of the neuronal structure and dynamics of the brain mechanisms that give us a perspectival volumetric representation of the world around us (the retinoid system) IS a causal explanation of feeling within the norms of science.

Following the implications of the retinoid model of feeling, we can systematically induce in your brain a variety of feelings that cannot be otherwise explained except by the neuronal activity of the retinoid mechanisms.

Here is an example:

1. Subjects sit in front of an opaque screen having a long vertical slit with a very narrow width, as an aperture in the middle of the screen. Directly behind the slit is a computer screen, on which any kind of figure can be displayed and set in motion. A triangular-shaped figure in a contour with a width much longer than its height is displayed on the computer. Subjects fixate the center of the aperture and report that they see two tiny line segments, one above the other on the vertical meridian.

2. The subject is given a control device which can set the triangle on the computer screen behind the aperture in horizontal reciprocating motion (horizontal oscillation) so that the triangle passes beyond the slit in a sequence of alternating directions. A clockwise turn of the controller increases the frequency of the horizontal oscillation. A counter-clockwise turn of the controller decreases the frequency of the oscillation. The subject starts the hidden triangle in motion and gradually increases its frequency of horizontal oscillation.

Results:

As soon as the figure is in motion, subjects report that they see, near the bottom of the slit, a tiny line segment which remains stable, and another line segment in vertical oscillation above it.

As subjects continue to increase the frequency of horizontal oscillation of the almost completely occluded figure there is a profound change in their experience of the visual stimulus.

At an oscillation of ~ 2 cycles/sec (~ 250 ms/sweep), subjects report that they suddenly see a complete triangle moving horizontally back and forth instead of the vertically oscillating line segment they had previously seen.

As subjects increase the frequency of oscillation of the hidden figure, they observe that the length of the base of the perceived triangle decreases while its height remains constant. Using the rate controller, the subject reports that he can enlarge or reduce the base of the triangle he sees, by turning the knob counter-clockwise (slower) or clockwise (faster).

3. The experimenter asks the subject to adjust the base of the perceived triangle so that the length of its base appears equal to its height.

Results:

As the experimenter varies the actual height of the hidden triangle, subjects successfully vary its oscillation rate to maintain approximate base-height equality, i.e. lowering its rate as its height increases, and increasing its rate as its height decreases.

NONE OF THESE FEELINGS CORRESPOND TO THE ACTUAL RETINAL INPUT TO THE SUBJECT, YET ALL OF THESE FEELINGS ARE IN ACCORDANCE WITH WHAT THE RETINOID MODEL OF FEELING PREDICTS. It seems straightforward to me that this is a good example of how the retinoid model of consciousness provides a causal explanation of feeling.

For a more detailed account and additional empirical support for the retinoid theory of feeling/consciousness see here:

http://people.umass.edu/trehub/YCCOG828%20copy.pdf

and here:

http://theassc.org/documents/where_am_i_redux

Stevan Harnad  15 August 2012 15:48

PSYCHOPHYSICAL MODELS EXPLAIN DOINGS, NOT FEELINGS

Arnold, I don't doubt at all that your model explains some dynamic illusions, but you have to remember that illusions, just like "veridical" perceptions, consist of two things: doings and feelings.

In the Muller-Lyer illusion, for example, one of two equal-length lines looks longer, depending on whether the arrows at the end of the lines are facing in or out. Subjects can adjust the line lengths until they look of equal length, but then one of the lines will in reality be longer. A (perspectival) model of psychophysical length recognition and judgment could, like your retinoid model, predict what combinations of inward and outward pointing arrows will produce what combination of length judgments. That's important, and it is indeed a causal explanation, but it is a causal explanation of doings: recognition and length discrimination. It does not explain why any of it feels like anything.

The feelings are tightly correlated with the doings (so tightly, that one would have to believe in voodoo to imagine that anything but the brain causes both) and hence...
Inman Harvey  Harvey - No Hard Feelings: Why Would An Evolved Robot Care?

Abstract: When studying cognition and consciousness, there are three possible strategies: one can introspect in an armchair, one can observe natural cognition in the wild, or one can synthesise artificial cognition in the lab. Some strands of Artificial Life pursue the third strategy, and Evolutionary Robotics opens up a particular new approach. Whereas most attempts at building AI systems rely heavily on designs produced through introspection and therefore reflect the current fads and intellectual biases of the moment -- the evolutionary approach can start from the assumption that we humans are likely to be hopeless at designing cognitive systems anything like ourselves. After all, one would not expect a nematode worm with just 300 neurons to have much insight into its own cognitive apparatus.

The evolutionary method does not need the designer, the Watchmaker with insight. But it does need clear operational tests for what will count as cognition -- goal-seeking, learning, memory, awareness (in various objective senses of that word), communicating. We can evolve systems with many such cognitive abilities; so far to a rather limited extent with proofs of concept, but with no reason to expect any barriers in principle to achieving any behaviours that can be operationally and objectively defined. Of course, there are no operational tests to distinguish a so-called zombie from its human counterpart that has feelings, so this seems to leave unresolved the question of whether an evolved robot could indeed have subjective feelings.

Harnad (2011) laid out one version of this issue in a paper entitled "Doing, Feeling, Meaning and Explaining", suggesting that the Doing (that can be verified operationally) is the Easy part; whereas the Feeling, and probably by extension the Meaning are the ineffable and Hard parts. In contrast, I shall be focussing on the Explaining, and pointing out that different kinds of explanations are needed for different jobs. In particular the concept of awareness, or consciousness, has a whole range of different meanings that need different kinds of explanation. Many of these meanings can indeed be operationally and objectively defined, and hence we should be able to build or evolve robots with these properties. But one crucial sense is subjective rather than objective, and cannot be treated in similar fashion. This is a linguistic issue to be dissolved rather than a technical problem to be solved.

http://www.sussex.ac.uk/Users/Inman Harvey h/consc.pdf

Harvey, I., (2000): Robotics: Philosophy of Mind using a Screwdriver
http://www.sussex.ac.uk/Users/Inman Harvey h/screwdriver.pdf

http://www.sussex.ac.uk/Users/Inman Harvey h/ISREEC-to_press.pdf

http://www.sussex.ac.uk/Users/Inman Harvey h/Evolution%20and%20the%20Origins%20of%20the%20Rational.doc

Comments invited

Post by Stevan Harnad

15 comments:

Martha Shiell  3 July 2012 13:17
I liked Harvey's idea of zillions of types of consciousness(s), up to where it includes a robot sensing a stimulus as consciousness. I don't think that sensing a stimulus is a gradation of consciousness; can we agree that consciousness is an additional process?

Adelle Tufford  3 July 2012 14:42
I guess sensing a stimulus is just one piece of the pie - you've got to have computation and output (whether that output is internal in the form of a 'thought' or external in the form of overt behaviour), and a sense of agency. I do agree that this is sufficient for THEIR VISUAL FIELD. Harvey failed to define what it is that unites these forms of consciousness- what is their shared characteristic which allows us to assign them all as shades of consciousness?
Harvey seems to define Consciousness_1...Consciousness_n as objective, observable types of access and agency but Consciousness_* as inherently subjective and not truly existing (or at least observable) out in the world.

Our species, our present bodily condition, and the contexts from which we develop and that from which we now reside, all affect the state of our minds. So follows that differences in consciousness do occur (e.g. you sober vs. drunk). There is no absolute standard or threshold, only observable effects of mental function.

I do not share the enthusiasm about the idea of zillion types of consciousness. I prefer the idea of levels of consciousness or the idea of steps, found in the ToM for example. If Harman is right and consciousness is all about feeling, I prefer the idea of a continuum of ways to feel, developed during our phylogenetic history.

I also agree with Adele Tufford that a sense of what unites all these zillion forms of consciousness/a shared characteristic was missing and would be interesting to consider.

I agree that without providing a specific set of criteria to define consciousness (unless I missed something...), Harvey's attributions of consciousness seems too broad (e.g. a smoke alarm being conscious when it "senses" smoke). As we move towards a better understanding of consciousness, the concept of consciousness must be scientifically useful. Does any organism, for Dr. Harvey, NOT have consciousness? If so, the answer will help better define what is meant by consciousness in Dr. Harvey's account. If not, then the concept loses its semantic usefulness, and I will better describe what he is labeling as 'conscious' with other, more agreed-upon terms.

I do not think that robots have a type of consciousness. Did any of the other speakers agree with this view? Do people agree that his 3-tailed horse is more less equivalent to Graziano's squirrel (as Dr. Harman has mentioned)? I guess I was under the impression that it either feels like something to be something or it doesn't? how does this fit into Harvey's zillion types of feeling/consciousness?

For the conscious_n type of awareness, I use this to refer to "all" the zillion types of awareness one can conceivably think of, and invent operational test for. So yes, all organisms have various kinds of consciousness_n; and even simple mechanisms have simple kinds of consciousness_n. So a smoke-alarm is conscious_00378 of smoke, but not conscious_00679 of time; whereas an alarm clock is conscious_00679 of time, but not conscious_378 of smoke. These are objectively definable properties, and operationally testable -- you can take them back to the shop and get a refund if they don't work. Similarly all the conscious_n properties of humans (and indeed animals and flowers and bacteria) are, as I define the term conscious_n, operationally testable. BUT there is another sense of consciousness, namely what I define as consciousness_* (to make clear it is different from any or all of the conscious_n), that goes beyond these objectively testable kinds; the touchy-feely kind, the subjective 'I am enjoying the red sunset' kind. And this is subjective, not objective, cannot be operationally testable -- and hence it is absolutely pointless, indeed meaningless, to try and 'build this into a robot.' Similarly it is meaningless to discuss whether a horse or a dog or a robot 'has' this consciousness_*. 

"a smoke-alarm is conscious_00378 of smoke"

A smoke-alarm responds to smoke, just as a billiard-ball responds to a clunk from another billiard-ball. If every dynamic Newtonian interaction in the universe is conscious, the universe is a lot more animate than what we had thought (about some biological organisms, on one small planet)! No, this just a symptom of loose use of ambiguous weasel-words. Only (some) organisms feel (sometimes), and smoke-detectors do not. And feeling is what the hard problem is about. (How? Why?)

And whereas there are no doubt countless different things that organisms feel and can feel, qualitatively and quantitatively, the fact they feel is one fact, and an all-or-none one, not a matter of degree.

Original post on FB. Great lecture! One detail: I was not entirely convinced by Dr. Harvey's claim that scientific and philosophical interest in phenomenal consciousness arises from a linguistic confusion. There is a pretty clear explanation as to why the conclusion that there is a horse with three tails is fallacious. If we translate the fallacious argument in first-order predicate logic, we will notice that there is a confusion regarding the scope of the quantifiers involved. In first-order predicate logic, the conclusion that there is a horse with three tails simply does not follow. (This is in line with Quine's famous argument in 'On What There Is' that in order to determine whether something exists, we need to rephrase our scientific theories in first-order predicate logic. If our theories (so rephrased) quantifies over the purported object, then it exists.) But it does not seem to me that we can use a similar logical trick to explain phenomenal consciousness away.

Dr. Harman defines consciousness as feeling. If consciousness is all about the feeling, then it's not really defined by the doing, by actions. Therefore, the Turing test is extremely limited; because it assumes a definition of consciousness based on action and not on feeling. For example, locked-in syndrome patients are thought to be conscious, but they don't show any actions. The turing test would fail to categorize that persons as conscious. Likewise, assume hypothetically that I could indeed create a
Three basic questions have generated most of the robotics research interest to date: Where am I? (Localization) What does the world look like? (Mapping) How to go from A to B? (Path planning)

I will examine several answers, identifying common themes. Where? and what? concern understanding the world and the robot's place in it: the Simultaneous Localization and Mapping (SLAM) problems. Localization generalizes to knowing about oneself, while mapping generalizes to knowledge representation, touching several fields. Solutions are based on both parametric and sample based strategies. Path planning is interesting, both theoretically and experimentally. I will review analytical solutions and randomized strategies from a historical perspective together with examples of current systems.

Until recently robotics was trying to understand the world. Current and future research is more concerned with changing it. The problem of

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manipulating and grasping has gained prominence in the last few years. In the past, robots were concerned with moving through the environment, avoiding contact, and constructing models. Today, robots approach objects, use contact, and moderate forces to understand and modify the world.


Comments invited

10 comments:

Izabo Deschenes 4 July 2012 21:04
I enjoy Dr. Rekleitis’ talk and although his research seems to center around robots as tools, specifically relating to environmental monitoring, and not a way of understanding ourselves, I appreciated him advancing opinions as to possible functions and evolution of consciousness in relation to this (especially in the end of the day discussion). Also, the idea that these more simple robots could be used as stepping stones toward parts of a full conscious robot (as he mentioned he can reproduce a robot that does almost all of the definitions Dr. Hamad had listed are equal to feeling in his talk, in separate robots) But even if we put all these parts together, will this robot have consciousness? Would this robot have a feeling of what it is like to be a robot? I guess we would then have a T3 and all the issues/questions about identifying consciousness that go with it. It seems there is no escaping this hard problem!

Ioannis Rekleitis 7 July 2012 21:42
I find that many definitions have different meaning for different people. Understanding is a good example. What does it mean to understand something? If I encode a set of rules that fully describe and predict a phenomenon, would the resulting robot understand this phenomenon? How about understanding the rules of traffic? Many conscious people clearly do not understand them, would a driverless car with the rules encoded in it, really understands? Interesting questions, I am really enjoying participating in the school.

Marjorie Morin 25 July 2012 13:34
I really love this example, because when someone is just following the rules, we say that he/she acts like a robot (even if this person has consciousness). I think it really means that they are not flexible with this knowledge. And I guess there is the way “understanding” feels, like grasping that now I make sense of all these rules, which would mean having consciousness (like in comics when there is the light bulb over the head of the person) which robots don’t have for now I guess.

Shady Rahayel 28 July 2012 16:19
We often say that the best soldiers are those who act like robots because (1.) they obey to commands and (2.) they do not seek to understand the rationale behind these commands. Those who might always be questioning decisions would end up morally conflicted. So I was wondering to what extent would an army of robots be an actual solution of these moral conflicts: behaving without necessarily understanding the behaviours they’re doing. We’re nearer to the “army of robots taking over the world” joke I. Rekleitis made during his speech! :D

Romain Vincent 5 July 2012 11:52
Maybe to say that the robot “understands” its environment is a bit misleading. We tend to ascribe mental states to things but it does not mean that these things really are in these states. As John Searle says, there is a gap between first person intentionality (the intentionality showed by humans) and derived intentionality (the one we give to objects and animals).

Ioannis Rekleitis 7 July 2012 21:47
As I said above, difficult question. However, many humans seem to have trouble to understand their surroundings also.

Alexandr Duval 25 July 2012 08:22
I wonder how the frame problem as it is studied in philosophy is related to the kind of work that Dr. Rekleitis does in robotics. The philosophers’ frame problem (which is different from the frame problem as it was originally defined in AI, from what I understand) is the problem of determining how an intelligent being must update his beliefs as it interacts in and with its environment. It is a fundamental problem, it is argued, because there is no known algorithm that could be used to determine which beliefs should be updated if the robot entertains complex enough representations of the world in its database. I would be tempted to think that the frame problem does not appear in any guise in Rekleitis’ work because the sensory systems of the robots he showed us only have to carry very specific type of representations of their environment – such as (in the case of the lake robot) their orientation, their speed and the location of various rocks below them. The robots did not have to entertain anything like global representations of their environment as an integrated whole. If I am right, then it seems that this type of research is still a long way from answering the three fundamental questions of robotics that Rekleitis raised in his talk. (The lake robot would be completely lost in situations for which his sensory systems has not been designed -- for instance, if a earthquake suddenly occurs and the rocks at the bottom of the lake are completely shuffled in less than a few seconds).

Nico Sheppard-Jones 31 July 2012 16:50
I recall the beginning of Dr. Rekleitis’ talk, when he spoke about a robot’s ability to ‘feel’ a pinch, a handshake, a rainbow etc. Of course, this goes against much of what was implicitly held true at the summer institute, namely that a robot that is ‘doing’ is not ‘feeling’. Discussions on the nature of pain asked the following: is an animal ‘feeling’ pain, or is an animal ONLY reacting to nociceptive input? Considerations about robots frame the same question differently: to what extent is ‘feeling’ related to ‘sensing’, as is unarguably done by all sorts of machinery? We all agree that it is possible to ‘do’ (in the very restrictive sense of carrying out a particular action in the world) without ‘feeling’. But is it possible to feel without sensing - thus without ‘doing’? I may be misunderstanding something here, but I know this last question has been put forth in slightly different form (I believe in the Damasio discussion).

Stevan Harnad 5 August 2012 17:16
FEELING WITHOUT DOING
Well, feeling a migraine is feeling without doing. But of course there will always be neural doing behind every feeling.

Dario Floreano -- Evolution of Adaptive Behavior in Autonomous Robots

Dario Floreano  Evolution of Adaptive Behavior in Autonomous Robots

VIDEO

Abstract: A spectacular demonstration of the power of natural selection comes from experiments in the field of evolutionary robotics, where scientists have conducted experimental evolution with robots. Evolutionary robotics has also been advocated as a method to automatically generate control systems that are comparatively simpler or more efficient than those engineered with other design methods because the space of solutions explored by evolution can be larger and less constrained than that explored by conventional engineering methods. In this talk I will examine key experiments that illustrate how, for example, robots whose genes are translated into simple neural networks can evolve the ability to navigate, escape predators, co-adapt brains and body morphologies, and cooperate. We present mostly -- but not only -- experimental results performed in our laboratory, which satisfy the following criteria. First, the experiments were at least partly carried out with real robots, allowing us to present a video showing the behaviours of the evolved robots. Second, the robot's neural networks had a simple architecture with no synaptic plasticity, no ontogenetic development, and no detailed modelling of ion channels and spike transmission. Third, the genomes were directly mapped into the neural network (i.e., no gene-to-gene interaction, time-dependent dynamics, or ontogenetic plasticity). By limiting our analysis to this kind of system, we are able to highlight the strength of the process of Darwinian selection in comparable simple systems exposed to different environmental conditions.

http://www.plosbiology.org/article/info%3Adoi%2F10.1371%2Fjournal.pbio.1000292

http://www.mitpressjournals.org/doi/abs/10.1162/1064546053278991

Comments invited

Posted by Stevan Harnad

21 comments:

Romain Vincent  3 July 2012 10:17
This talk was really interesting. I'm not an AI professional, but I share with the author the intuition that robot must show behavioral plasticity in order to look (become?) conscious. The next step in this direction is maybe to give the robot the ability to code its own behavioral responses to achieve a goal. If we give him a goal to care about and the ability to reach this goal in creative ways, this could be a real progress.

Martha Shiell 3 July 2012 14:35
Evolutionary robotics looks awesome! If a robot did evolve a form of consciousness (supposing we agree that consciousness is something in addition to sensing the environment), how would we know? We cannot use this technique to find the function of consciousness unless we have a technique for identifying consciousness.

Martha Shiell 3 July 2012 14:44
I don't understand why building physical robots is necessary for this technique. Couldn't all of the physical aspects be modelled in a computer program?

Carey YL Huh 6 July 2012 15:49
But watching physical robots is more entertaining! :) I suppose there must have been a good reason since using simulations would have gone much faster! Maybe it has something to do with Dr. Floreano's very first slide with the artistic rendition of what he wants to build someday, real flying robots lined up in scary-looking formations ready to attack!

Dario Floreano 20 July 2012 08:47
Thanks to the new set of physics-based simulations, these days it is possible to carry out realistic experiments with robots in simulation. However, there are still important aspects where real and simulated robots are different and these differences can be picked up and amplified by artificial evolution. As a result, controllers evolved in simulations do not work in reality. Furthermore, if you do not build a physical robot to start with and work only in simulation, you may be led to simplify your simulated robot and introduce assumptions about perception and action that do not hold in the real world. Finally, even physics-based simulators cannot handle well multiple physical interactions that occur when you have multi-robot systems: this often results in the software halting unexpectedly or in computation running slower than real time.

What I often do these days is to start by building a physical robot that fits my research goals and then simulate it with a physics-based software. Most of the evolutionary experiments are run in the physics-based simulator and the resulting controllers are tested on the physical robots to check for inconsistencies and possibly refine the simulator parameters.

Adele Tufford 3 July 2012 14:53
I think what Floreano is doing with his group is impressive. Although I can't exactly tell if it was just for entertainment's sake, I am a big fan of the anthropomorphization of evolved robot traits: 'vanity, selfishness, sun-worship, altruism'.

When put in the context of an experimental framework for understanding consciousness, however, I'm not sure if using these attributions will really get us closer to understanding how these traits function in humans.

Vincent LeBlanc 4 July 2012 16:35
I don't think the model he's using can explain how these traits function, but it does shed some light on certain behaviors that we're considered maladaptive (i.e. altruism).

Also, if we're looking to build a machine that passes the Turing test (in this case, T3), we don't need to understand HOW to create certain functions. We only need to give AIs the proper tools for them to develop these functions through Evolution Robotics. We can then analyse the Turing Test candidates and see what computations create the functions we're interested in.

That will not solve the Hard Problem, but it is a nice way to take on the easy one.

Izabo Deschenes 4 July 2012 21:27
I agree with Martha, evolutionary robotics looks awesome! I have to look up more information and read more papers in this field, but I find the idea of, not only autonomous robots, but adaptive behaviour in robots quite fascinating. (Maybe in some way because it makes them seem more human.)

Also, I don't know if this is way off or has already been answered but I was wondering if we are recreating a sort of natural selection in these autonomous robots, which leads to the evolution of adaptive behaviour, how does recombinant DNA (I guess it wouldn't be DNA in the case of robots, but whatever their equivalent is) and random mutations fit into this 'evolution' of robots? Do those human equivalents exist in 'robot evolution' or is it a completely different process?

Inge Broer 19 July 2012 12:53
Yes! I was also wondering -how- or -through what mechanisms- they were evolving. Did I miss this?

Sarah Etezadi 6 July 2012 12:31
How do the robots "know" what to do? I realize they are programmed, but I am unclear as to the extent of their programming. Take for example the "Active Vision" robot that was moving around in the office. It was basically a pan-tilt camera on wheels, with a proprioceptive pseudo-neural network, etc. It could "maximize fitness" by moving around the environment (within the confines of the four mini-walls set up on the office floor). Some of the initial generations of robots paid attention to things that, as Dario put it, were not relevant to the task - for example, the window and the camera. If the task is to move around, and the robot is programmed to do this, why wouldn't it? If the task is to move around and the robot is not programmed to do this, then why would it? Either way I have trouble viewing the results (no matter how fascinating) as possibly refining the simulator parameters.

Sarah Etezadi 6 July 2012 12:33
Relatively, the question that arose in me when watching the pan-tilt robot in the office was: Why did it "choose" to look out the window, and what made it "want" to look at the camera? Perhaps it is merely scanning the environment in order to fulfill its objective (did it have one?) if then what made it focus on those particular things? Chance? Why not move on? Also, I have to say that I found it oddly moving to see the robot gazing at the sun and then equally depressing to see it in its
neurology assessment. I would have no reason to doubt of the consciousness of an evolved robot if it could successfully pass soma-adapted version of Damasio's clinical

inability for him to assess consciousness in his "patient B". He answered that assessing consciousness state of a patient is one of the first thing he learned in clinical

Floreano, but rather universal (robots and humans). I think Dr Damasio brought up an important point when he answered a question from the audience regarding the alleged

Inge, I understand your point regarding the difficulty to assess consciousness in an evolved robots, although I believe this caveat is not specific to the approach of Dr

Sébastien Tremblay consciousness.

has evolved to be conscious"? And perhaps that isn't the relevant question. Perhaps better question are: what are the mechanisms for this machine to be so capable of

Absolutely! I agree that it's a very interesting approach and we might indeed get to a mechanism of evolution of consciousness. However, to me, it still begs the question:

Inge Broer childhood. Although, I think children are probably conscious quite fast, so not sure how relevant this is in the topic of consciousness. Ah well: just a thought!

Maxwell J. Ramstead I find it very interesting that evolutionary robotics seems to mimic findings concerning group selection versus genetic similarity in evolutionary robotics. This new field

opens fascinating possibilities for both cognitive neuroscience and biology proper. Extremely interesting possibilities.

Pauline Claude PREVIOUSLY POSTED ON FACEBOOK: "As an evolutionist, I found the talks on evolutionary robotics absolutely stunning, especially that of Dr. Floreano. However, I was wondering why we would like to study consciousness through robots? It appears to me that if we are doing so, it is because we kind of wanna prove that the idea of consciousness is not limited to living beings? Dr. Floreano almost convinced me that in theory, we could be able to create a robot that have a certain form of consciousness and that this form of consciousness could be very similar to that found in humans and would be able to develop human-like abilities such language, decision making and free will. It seems to me that studying consciousness through robots is the same as trying to say that if you combine the matter with the right conditions, you'll have a form of consciousness and this form of consciousness has to be completely encoded and that it should be the same for humans. Evolutionary robotics is like demonstrating that human consciousness is no more than the result of the expression of our own encoding, mainly our DNA. This encoding has to be universal but its expression can be control by environmental stimuli. Combination of billion of environmental different stimuli let us think that life, and especially in the case of humans, cannot be totally encoded, mainly it cannot be totally determined. However, robots is the evidence that life is completely determined and predictable. Actually, nothing is random because it simply follows the laws of physics and some abilities such as free will that we attribute our species as being uniquely human are no more different that what we found in all other living beings... in that prospective, what does it mean to be human? does it has anything to do with consciousness? My intuition tend to tell me that it doesn't..."

Inge Broer I'm not a robotics specialist but this discipline seems to be very interesting and useful, even though it's still too difficult to imagine this subject applied to a consciousness

explication. The experience in which robots learn not to bump into the wall is impressive. I was wondering if robots are able to use their just learnt ability within a new (totally different) environment.

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explication. The experience in which robots learn not to bump into the wall is impressive. I was wondering if robots are able to use their just learnt ability within a new (totally different) environment.

Sebastien Tremblay PREVIOUSLY POSTED ON FACEBOOK BY Sebastien Tremblay Dr Floreano's work on adaptive behavior in autonomous robots offers, in my opinion, the best model so far presented in this conference to bring up a distal explanation to consciousness. Although it may seem counter-intuitive to work with unconscious robots to explain why consciousness exists, I believe that the power of this approach resides in the possibility to reenact evolution under experimenter-defined selection pressures. Understanding what selection pressures could favor an adaptation as abstract as consciousness would not only illuminate us on its true adaptive function, but also provide insights as to which other living entities might have evolved a consciousness as a result of a similar selection pressure history.

Martha Shiel When the audience member asked about robot evolution for complex multisensory integration, it would have been interesting to speculate on the adaptations that robots may have developed... I think consciousness may play a role in this.

Inge Broer Absolutely! I agree that it's a very interesting approach and we might indeed get to a mechanism of evolution of consciousness. However, to me, it still begs the question: How would such an evolved machine communicate its consciousness to us? What might it look like? If it's true that there are many consciousnesses, as Harvey kept driving home, some machines are already conscious of relevant stimuli in their environment. At what point do we say: "Yes. Within these restrictive conditions, the machine has evolved to be conscious"? And perhaps that isn't the relevant question. Perhaps better question are: what are the mechanisms for this machine to be so capable of knowing its environment? Perhaps the same logic applies to the study of consciousness in humans. But then we'd again continue studying the "easy problem" of consciousness.

Sebastien Tremblay Inge, I understand your point regarding the difficulty to assess consciousness in an evolved robots, although I believe this caveat is not specific to the approach of Dr Floreano, but rather universal (robots and humans). I think Dr Damasio brought up an important point when he answered a question from the audience regarding the alleged inability for him to assess consciousness in his "patient B". He answered that assessing consciousness state of a patient is one of the first thing he learned in clinical neurology training ! I would have no reason to doubt of the consciousness of an evolved robot if it could successfully pass soma-adapted version of Damasio's clinical neurology assessment.
Pascal Riendeau
I disagree. I’m far from sure consciousness has an adaptive function, and if it has one, it might only be in virtue of being a necessary emergent property of information integration over time, the likes of which we see in brains. Studying the neural correlates of consciousness is much more neutral in that regard, no?

Vincent Duhamel
Sébastien Tremblay “I would have no reason to doubt of the consciousness of an evolved robot if it could successfully pass soma-adapted version of Damasio’s clinical neurology assessment.” That’s way too easy. You can program a robot to disclose its hierarchy of goals or internal states. Characters in video games do this all the time. I don’t think we should say they are conscious.

Sébastien Tremblay
Pascal, studying the neural correlates of consciousness would at best provide a proximal explanation (how?), not a distal one (Why?). The interest that this conference has toward evolution theory implies the assumption that consciousness is an adaptation. But in a strict sense you are right; consciousness remains to be proven an adaptation by contrasting the fitness of individuals with and without the phenotype.

Sébastien Tremblay
Vincent, the neurological examination goes a little bit beyond GTA3-like conversations.

Xavier Déry
31 July 2012 11:19
Paraphrasing Dario Floreano : "Nothing in the past makes sense, exept from the evolutionary perspective." Best opening statement!

Xavier Déry
31 July 2012 11:21
Use cerebral lesions to understand the evolved behavior of organisms? Of course, you say. Well Floriano et al. do it on robots too!

Pier-Éric Chamberland
1 August 2012 16:29
COPIED FROM FACEBOOK :

Pier-Éric Chamberland :
Mr Floreano’s presentation, on the robot that mistakenly focus on the sun
I understand the robot is analyzing the sun as a possible affordance?
What fascinated me is that it concluded that it was not relevant or useful to his “objectives”

Sarah Etezadi :
A similar question arose in me when watching that same robot in the office. Why did it “choose” to look out the window, and what made it “want” to look at the camera? Perhaps it is merely scanning the environment in order to fulfill it’s objective, as you say, but then what made it focus on those particular things? Chance? Why not move on? Also, I have to say that I found it oddly moving to see the robot gazing at the sun and then equally depressing to see it in it’s final evolution - functioning “perfectly” with its head down staring only at the line of the floor! Crazy anthropomophising, I know, but it was like it had been lobotomized or something.

James Clark: Attention: Doing and Feeling

James Clark  Attention: Doing and Feeling

VIDEO

Abstract: Humans perceive the world in an active fashion, and process only a limited subset of the sensory data available to them. Attention selection mechanisms decide on which parts of the sensory stream to focus on. This lecture will consider two threads linking attention and consciousness. The first is the finding that the contents of consciousness (feeling) depend strongly on what is being attended to, as indicated by the “Change Blindness” phenomenon. The other thread is the connection between motor activity (doing) and attention, as espoused by Rizzolati’s “Pre-Motor” Theory of Attention, and embodied consciousness theories, such as O’Regan’s Sensorimotor Contingency Theory. The implications of the role of attention on consciousness for the Robotic Turing Test will be discussed.


http://cogsci.uni-osnabrueck.de/~nbp/PDFs_Publications/OREgan.BBS.01pdf.pdf

Comments invited

Posted by Stevan Harnad

13 comments:

Stevan Harnad  1 July 2012 11:51
James Clark talked about doing, detecting and attending, not doing “feeling” and attending.
I would agree with the enactive theory, and that there would be no feeling without doing (or without planning to do, and having the capacity to do). This is not in conflict with the schemas I presented, or at least intended to present. There was no dichotomy to be implied in what I presented. As I said in the talk about the link between attention and action being two sides of the same coin, the enactive approach similarly considers doing and feeling as two sides of the same coin.
It was actually that poster that made me start thinking about this, very interesting stuff!

Matthew Leavitt  10 August 2012 07:34
Dr. Clark stated that "we are conscious of, or feel, that which we attend to...we act only on what we attend to (or vice versa)"; but there were multiple examples presented during the summer school of people acting on things that they did not attend to (e.g. Dr. Haggard's experiments, Dr. Pito's blindsight patients). I assume Dr. Clark was paraphrasing the sensorimotor model of consciousness, so is it possible to reconcile this model with these findings?

Matthew Leavitt  10 August 2012 07:36
Additionally, I don't think he ever explicitly defined consciousness, but from what he presented I assume his definition would be something like "consciousness is the result of the attention-action loop". Thoughts? Corrections?

Klara Kovarski  19 August 2012 13:44
I was wondering if someone had ever studied the different kinds of modification in the "change-blindness paradigm": is there any difference between a "natural" change (a change that could really occur in a very short time) and an "unnatural change"? For example, I suppose that a normal person should look for a change concerning people rather than all those details that can't naturally change.

Michael Graziano: Consciousness and the Attention Schema

Michael Graziano  Consciousness and the Attention Schema

Abstract: One possible explanation of awareness is that it is a construct of the social perceptual machinery. Humans have specialized neuronal machinery that allows us to be socially intelligent. The primary role for this machinery is to construct models of other people--minds thereby gaining some ability to predict the behavior of other individuals. In the present hypothesis, specific cortical machinery, notably in the superior temporal sulcus and the temporo-parietal junction, is used to build the construct of awareness and attribute it to other people. The same cortical machinery, in this hypothesis, is also used to attribute awareness to oneself. Damage to this cortical machinery can lead to disruptions in consciousness such as hemispatial neglect. In this theory, the value of the construct of awareness, and the value of attributing it to a person, is to gain a useful predictive model of that person--attentional processing. Attention is a style of information processing in the brain in which neuronal signals compete. One interleaved set of signals rises in strength at the expense of others, and thereby dominates the control of behavior. Awareness, in the present hypothesis, is a construct, a useful schema, that models the dynamics and essential properties of attention. To be aware of X is to construct a model of one--attentional focus on X. A brain concludes it is aware of X, and assigns a high degree of certainty to that conclusion, and reports that conclusion, because of an informational model that depicts awareness of X.

http://www.ncbi.nlm.nih.gov/pmc/articles/PMC3223025/

Comments invited

Posted by Stevan Harnad

20 comments:

Stevan Harnad  1 July 2012 14:14
Inman Harvey  Harvey's horse meets Mike Graziano's squirrel!

But when I have a headache, what I have (Cartesian) certainty about is what "feels like" a headache (right now) -- no certainty about having a head: it might be referred back pain, or phantom head pain, or I may not have a head, nor a body; there may be no external world -- just Cartesian certainty about what it "feels like" right now. And feeling is not a squirrel, nor a description, nor magic. It's feeling. All mammals -- and probably all vertebrates and invertebrates too -- have it. And if they can doubt at all, if they are doubting that they are feeling when they are feeling doubt, they are contradicting themselves (hence not making sense).

Emma Cusumano  1 July 2012 18:25
"Awareness, in the present hypothesis, is a construct, a useful schema, that models the dynamics and essential properties of attention."

What does the model afford?

Attention has a clear function: it selects important features of our environment. Couldn't we access and benefit from "the dynamics and essential properties of attention" simply by having attention, without this extra step of awareness (feeling)?

It's as if Graziano is saying something like, awareness is what attention feels like to us. In other words, feeling is what attention feels like to us. This is like what Damasio says about homeostasis: consciousness is what homeostasis feels like to us. Maybe they wouldn't agree with these statements; but if they do they are begging the (Hard) question.
Stevan Harnad 1 July 2012 22:29

Good points. One cannot simply pick an obviously adaptive function — doing — and baptize it "feeling," saying "that's" what feeling really is. I can say the same thing about moving, or breathing: That's what feeling (consciousness) really is. Why? How? (And, by the same token, why and how is selective attention — indisputably useful — "felt" selective attention, rather than just selective attention [i.e., doing]?)

TO THOSE WHO ARE FANS OF THE SQUIRREL ARGUMENT:

What "is" the squirrel argument (Graziano)? Try to repeat it to show what it assumes and what it implies. I feel there is a squirrel in my head. There is no squirrel in my head. Maybe I have no head. But if I feel it, I feel. That feeling is not a squirrel, it is a feeling. How does the non-existence of the squirrel imply the non-existence of the feeling? And what has this to do with description, or magic? (You have been taken in by a bit of entertainment, like Mike's ventriloquist dummy, Kevin, and like Imman Harvey 's horse. Shake off the joke and root out the sense, if any.)

Maxwell J. Ramstead 3 July 2012 14:11

While I find Doctor Graziano's explanation of consciousness quite appealing—the idea that it could be an "attention schema"—I do find that it leaves the hard problem completely untouched. I am intrigued by the phrase: "Awareness is representation; attention is what is represented." However, I do not see what it is about being a description or representation of a particular object that would make the latter conscious. Why would such a representation be felt?

I agree with Doctor Harnd. Indeed, what is it about representation that would yield something like "feeling"? I understand that the squirrel argument would have it that the mysterious properties we attribute to consciousness are elaborate illusions—but this simply avoids the question entirely. From a Cartesian point of view, I cannot be in error about my feeling what I feel. How would one account for the feeling of a representation itself—and supposing that feeling was indeed an elaborate illusion, what accounts for the illusion?

Stevan Harnad 7 August 2012 19:32

This talk certainly resonates with many of my own perspectives. Though I think that Dr. Graziano has falsely described the hard problem, I certainly share his belief that we should expend our efforts explaining how the brain produces consciousness before we are fully able to understand the why we experience consciousness, or its adaptive functions.

To Dr. Hamad:

I believe Dr. Graziano intended the squirrel argument as an illustrative analogy. The non-existence of a squirrel in the head does not imply the non-existence of the feeling, and Dr. Graziano has not claimed such a thing.

Because only one patient feels as though there is a squirrel in his head, we approach this phenomenon in a very different way than we approach any other feeling. If one were to explain what it was in the brain that causes this man to feel as though there was a squirrel in his head, we would understand how the man came to feel as though a squirrel were in his head. However, suddenly when we replace the word squirrel with consciousness, many no longer believe that explaining all of its neurobiological mechanisms is sufficient to explain the presence of consciousness itself. This is an untenable position.

Stevan Harnad 2 July 2012 04:20

MORE ON MIKE GRAZIANO'S SQUIRREL, AND "KEVIN" AND MAGIC...

Notice all the weasle-words one falls into if one does not call a spade a spade (i.e., call feeling a feeling)? What I "know" for sure is that I feel something (anything) when I am feeling it. I know it because I am feeling it. I can be wrong about what that feeling implies about the world (e.g., there is something wrong with my tooth, I have a tooth, there is a squirrel in my head, I have a head, there is a world, etc. etc.). But I cannot be wrong that it feels what it feels like (while it is being felt). [Descartes].

So (many of) you have indeed been taken in by the entertainment. But it is a useful exercise — if you can now reason your way clearly through the whole thing.

Ditto for the ventriloquist dummy, "Kevin": What does it actually show, apart from the fact that a few cues are enough to make us think (and feel!) there's another thinking/feeling/talking person there? [Other-Minds Problem]. Did that teach you anything new about anything?

And what about the suggestion that feelings are really "descriptions"? Descriptions are symbol-strings: Have we not already gone through the limitations of computation as the physical substrate of cognition (Searle and the symbol grounding problem)? Mike Graziano is simply declaring that he is a computationalist here.

And magic? What's magic here? Mark Mitton is the magician. But he is showing you ways that the mind can play tricks on you, making you feel the wrong thing about the world — not that you might be wrong that you are feeling what you are feeling when you are feeling it.

Stevan Harnad 2 July 2012 13:30

When I feel a headache, is it an attribution of attention? (What on earth for?) I think it's just feeling a headache...
At least it seems to me that we know that we have an inner experience, and I don't think an information processing machine can arrive at that conclusion, and that information could be used for a brief general response to the kinds of comments that seem to come up frequently and that are also represented in this thread.

To all who have commented on my talk: thank you for the time and thoughtfulness! I have been wandering the jungles of a hiking trail, out of contact. Here I give a very brief general response to the kinds of comments that seem to come up frequently and that are also represented in this thread.

Although we "know" we have an inner experience, I just don't see how an information processing machine can arrive at that conclusion, and configure that information for a brief general response to the kinds of comments that seem to come up frequently and that are also represented in this thread.

I suggest in the following post one reason why Graziano should probably "not" say that attributions are just judgments, but there are many things other than judgment that the relevant sort of attribution/schema/representation might turn out to be.

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Grace Helton 2 July 2012 16:58
Yes, I am myself sympathetic to the idea that a headache isn't just (or even in part) an attribution of attention.

My point in this post was just that, contrary to what might be suggested by Graziano's 'squirrel' analogy/argument, Graziano doesn't actually deny "that" you have a headache, he just thinks it's nothing more than an attribution of attention. And this view may not be "so" radical, since attributions (or schemas or representations, as he also calls them) and attention aren't themselves very nailed down sorts of things. Before we know more about the sorts of schemas involved and maybe even about attention, it would be hard to pass judgment in the view.

I suggest in the following post one reason why Graziano should probably "not" say that attributions are just judgments, but there are many things other than judgment that the relevant sort of attribution/schema/representation might turn out to be.

Grace Helton 2 July 2012 13:28
My second point is about the predictions Graziano's theory would make about blindsight patients, in particular about blindsight patients who have learned that by considering their own guessing behavior, they can (with at least some reliability) attribute to themselves attention to some object. For example, a blindsight patient might learn to correctly attribute to herself attention to some object that is tilted at such-and-such an angle. If attribution of attention to some object is sufficient for being conscious of that object, is the trained blindsight patient then conscious of an object tilted at such-and-such an angle?

Also, and in a more critical vein, if the trained blindsight patient is conscious of (say) an object tilted at such-and-such angle, what is the difference between the trained blindsight patient, who apparently cannot "see" the relevant object, and the normal subject, viewing the same object? Is it merely a difference of degree, one that derives from the fact that the trained blindsight patient's information about the object is quite impoverished, whereas the normal subject's information about the object is comparatively rich? I'm a bit skeptical myself about whether this sort of difference could entirely account for the difference and am interested in what Graziano might say about such a case.

Carey YL Huh 3 July 2012 19:56
Dr. Graziano's theory on attributing awareness to others brought to my mind autism. Is autism not described as a deficit of relating to others? If the TPJ area is such an important part it would be interesting to look at functional and/or anatomical integrity of this area in autistic people. Given the theories relating autism with dysfunctions in fundamental synaptic mechanisms and presumably these deficits have widespread consequences on many brain areas, it is interesting that a specific area should be given a function which appears intuitively somewhat complex, higher-order and multimodal?

Bernard J Baars 5 July 2012 18:10
The only trouble is that this post-modern view contradicts all the neurobiological evidence.

The brain substrate of conscious perception, cognition, volition, etc., is the thalamo-cortical system. The evidence for that is available in many places, but permit me to recommend Baars & Gage, Fundamentals of Cognitive Neuroscience: A Beginner's Guide. (Elsevier/Academic Press, 2011). Chapter 8 has all the latest information about consciousness and attention in textbook form.

The above is true in mammals, and very plausibly in birds, which have analogous brain structures. Much evidence suggests that the same point applies to at least some cephalopods — which have mammal-size brains, many of them.

It follows that consciousness (or awareness) cannot be a social construct, either in ourselves, or in interpreting others. In the case of mammals and birds, the biological evidence is rock solid.

Roxane Campeau 12 July 2012 11:25
POSTED on FB during the talk

Roxane Campeau
If "we attend of what we do" and accordingly to the upper model on the first slide, which show that we are conscious of what we attend to, what we are suppose to conclude about the syndrome de la main étrangère?

Martha Shiel
Not familiar with that syndrome, can you expand? Along the same line, I can easily imagine a situation where someone acts on something that she isn't aware of, despite that she's still in a conscious state. Clark says this doesn't happen but he hasn't given us evidence to support this claim.

Roxane Campeau
http://www.neurology.org/content/67/12/E21.full.pdf

IIts like youre not conscious of mouvement of a part of your body, you dont have any feeling about it, you cant control those movements. So what does it tell about intention/attention and feeling?

Pauline Claude
Actually, I'm surprised and a bit disappointed that the summer school doesn't have any talks on consciousness-related "alterations" as found in pathological cases such as patients with "main étrangère" syndrome or some crazy ones such as synesthesias, somatoparaphrenia, apotemnophilia, anosognosia, out-of-body experiences and others (see the book of VS Ramachadran for more details http://www.amazon.com/The-Tell-Tale-Brain-Neuroscientists-Quest/dp/0393077829)

Frederic Simard 19 July 2012 12:47
I just watched this talk again, I love it. There is no squirrel in our head, haha!

Steven Harnad 21 July 2012 15:59
REPLY FROM MICHAEL GRAZIANO

To all who have commented on my talk: thank you for the time and thoughtfulness! I have been wandering the jungles of a hiking trail, out of contact. Here I give a very brief general response to the kinds of comments that seem to come up frequently and that are also represented in this thread.

Although we "know" we have an inner experience, I just don't see how an information processing machine can arrive at that conclusion, and configure that information for...
John Campbell : What does Visual Experience Have to do with Visual Science?
What does Visual Experience Have to do with Visual Science?

**Abstract:** The epistemic role of consciousness in sensory experience. Classically, vision science assumed we do not need to appeal to notions relating to sensory awareness to explain how it is that perception generates knowledge of our surroundings. Sensory experience has often been seen as an epiphenomenon in the generation of knowledge. This is not the view of ordinary common-sense. Ordinarily, we take that it is only because we have sensory experience that we can know what the objects and properties around us are. But where would a role for sensory experience fit in an account of the production of knowledge? I approach this question by looking at the contrast Huang and Pashler (2007) draw between the roles of visible properties in selecting and in accessing regions or objects in the visual field. I use this to articulate an account of the way in which an externalist account of perceptual experience relates to a classical account of visual computation.


Campbell, John, 2011, 'Visual Attention and the Epistemic Role of Consciousness', in Mole, Smithies and Wu (eds.), Attention: Philosophical and Psychological Essays (Oxford: OUP), 321-343. [PDF will be provided]
I agree completely that feelings are only a correlate. But what is left, if you remove that correlate, is just doings (not seeing, hearing, or smelling).

I changed a thing!

I think seeing is what it feels like to see, hearing is what it feels like to hear, smelling is what it feels like to smell. (I have thought and said that all along; I don't think we have a clear, crisp disagreement, John:)

Stevan Harnad: I'm concerned with the experiential relation of seeing. 'Feelings' are no doubt very important. But they're a different topic. They are constitutive of X-ing. The most it can show is that there are feelings that accompany X-ing.

You make much use of the phrase 'what it feels like to X'. The fact that there is such a thing as 'what it feels like to X' doesn't show that there are any feelings that are constitutive of X-ing. The most it can show is that there are feelings that accompany X-ing.

Feeling rapture or dismay are like the example of feeling tired that I mentioned above. They can accompany my seeing you, and they are feelings too, but they are not the same feeling -- or rather, although I don't really want to play phenomenological games, dissecting feelings into parts -- they are not the same "part" of the total feeling I am feeling when I am looking straight at you: I may simultaneously be feeling tired, stressed, under pressure from a tight necktie, smelling the dinner that's almost ready, seeing that the sun is setting -- and also seeing something that either does or does not feel like I am seeing you, depending on whether I am or am not recognizing you. (Needless to say, it's also irrelevant to lapse into pondering whether perception is phenomenologically serial or parallel...)

So just as it feels different to see you when I'm feeling tired, compared to seeing you when I'm not tired, it feels different to see you when I recognize you compared to seeing someone whom I don't recognize to be you, but you still want to hold on to the idea that feelings are somehow constitutive of seeing. I can't find any evidence for that at all.

Seeing is a relation between the perceiver and the scene observed. It's a subjective, experiential relation. That doesn't mean that 'feelings' are involved. Certainly introspection provides no support for the idea that feelings are involved. When I introspect my experience of seeing, what I encounter is not some 'feeling', but the ordinary concrete objects, the tables and chairs, and their properties.

You make much use of the phrase 'what it feels like to see'. The fact that there is such a thing as 'what it feels like to X' doesn't show that there are any feelings that are constitutive of X-ing. The most it can show is that there are feelings that accompany X-ing.

I'm concerned with the experiential relation of seeing. 'Feelings' are no doubt very important. But they're a different topic.

Stevan Harnad 9 August 2012 06:31
OPTICAL TRANSDUCTION VS SEEING

Well we have a clear, crisp disagreement, John:

I think seeing is what it feels like to see, hearing is what it feels like to hear, smelling is what it feels like to smell. (I have thought and said that all along: I don't think I changed a thing!)

I agree completely that feelings are only a correlate. But what is left, if you remove that correlate, is just doings (not seeing, hearing, or smelling).
And that is the (hard) problem.

John Campbell  13 August 2012 10:30
Excellent. The question is this: how do we characterize the subjective dimension of seeing as (a) an experiential relation that you stand in to the scene observed, or (b) a feeling?

We agree, I think, that (b) leads to the hard problem of consciousness, and in fact the conclusion that experience has no evident causal role.

The point about (a) is that it acknowledges a causal role for consciousness, in giving us knowledge of our qualitative surroundings, and frees us up from the idea that we have to explain the qualitative aspects of experience in neural terms. That was the point of my talk.

The idea that ‘seeing is just feeling’ does not seem to me to be an insight, but a source of insoluble problems. Why stick to it?

For anyone who wants a quick introduction to the alternative, but doesn’t want to listen to the whole lecture, there is a brief introduction here: http://115.28.79.36/bba6e8f06f26b05d32f43c97e03edc32c0dci3d27f6e39d0891a01c839f9d09a49b1&cid=1779d3f

Stevan Harnad  14 August 2012 19:09
PAIN IS “STANDING IN AN EXPERIENTIAL RELATION TO AN INJURY”?

Seems simpler to just say it hurts...

Martha Shawell  3 July 2012 13:09
Campbell’s focus on color makes me think: even within a single sensory modality, there is still integration of different features before our conscious experience of an object. A recent review of Johnson-Laird’s book was done by a scientist at the University of Birmingham, and he pointed out that researchers have found that isolated neurons only fire in response to sensory input, and that the conscious experience is in the brain. It seems to me that this kind of integration is the foundation of consciousness. (Remember what he says at the beginning of the talk: the 17th-century project of ‘analyzing the qualitative world in terms of its relation to consciousness’ has been a massive failure, whereas the project of explaining physical phenomena in terms of mathematical laws has been an amazing success.) But it seems to me that it is too early in scientific research to take this massive failure as a reason to adopt an externalist theory (which, in my mind, doesn’t have any explanatory value).

As I understand him, one of Campbell’s main motivation for defending an externalist theory of phenomenal experience comes from his dissatisfaction with the state of research on the nature of consciousness. (Remember what he says at the beginning of the talk: the 17th-century project of ‘analyzing the qualitative world in terms of its relation to consciousness’ has been a massive failure, whereas the project of explaining physical phenomena in terms of mathematical laws has been an amazing success.) But it seems to me that it is too early in scientific research to take this massive failure as a reason to adopt an externalist theory (which, in my mind, doesn’t have any explanatory value).

John Campbell  17 July 2012 12:01
Martha, I strongly agree. It’s a very natural idea that consciousness has something to do with the integration of the senses. But it would surely be pressing the idea too hard to say that you couldn’t have consciousness unless you had more than one sensory modality.

There is, of course, a lot more to say about this. You might argue that the reason why consciousness evolved was because it can function in integrating information from different sensory modalities. That would be consistent with your point that an individual with only one sensory modality could have enough complexity to sustain consciousness.

Maxwell J. Ramstead  3 July 2012 14:02
I found the epistemic role of conscious visual experience to be a fascinating theme for discussion. Indeed, while phenomenological methods have increasingly been operationalized in cognitive science (either implicitly in qualitative research methods or explicitly, in approaches like neuro- and front-loaded phenomenology), very little has been in the opposite direction, namely: the “phenomenologization” of cognitive science.

John Campbell  17 July 2012 12:09
Maxwell, thanks for that. I think this area is wide open for further discussion. Traditional epistemology, and common-sense itself, take it absolutely for granted that perceptual experience is the foundation of knowledge. In cognitive science, though, we find not only that (a) there isn’t any working role given to experience, but (b) the concept of knowledge itself seems to drop out. All cognitive science needs is the notion of a probability being assigned to a proposition by the system (if that). It seems to me most unlikely that experience and knowledge should be epiphenomena or some kind of illusion. But that means the challenge is to explain what experience and knowledge have to do with the phenomena described in cognitive science. That’s the question that is wide open.

Alexandre Duval  3 July 2012 18:00
As I understand him, one of Campbell’s main motivation for defending an externalist theory of phenomenal experience comes from his dissatisfaction with the state of research on the nature of consciousness. (Remember what he says at the beginning of the talk: the 17th-century project of ‘analyzing the qualitative world in terms of its relation to consciousness’ has been a massive failure, whereas the project of explaining physical phenomena in terms of mathematical laws has been an amazing success.) But it seems to me that it is too early in scientific research to take this massive failure as a reason to adopt an externalist theory (which, in my mind, doesn’t have any explanatory value).

John Campbell  17 July 2012 16:10
Alexandre, there are two questions here. One is whether the project of analyzing the qualitative world in terms of its relation to consciousness has been a massive failure. I’m not sure whether you’re willing to grant that it has. My point about that was that after all this time we don’t have a coherent model of consciousness that lets us see how consciousness could ‘project’ the qualitative world onto an underlying physical reality. Talk about ‘qualia’, ‘sensations’ and so on seems incoherent, because on the one hand qualia are theoretical characteristics or objects, postulated to explain something about experience, they’re not something we know about on the basis of experience because experience only even seems to give us knowledge of characteristics of the world around us, but we’re never even given any explanation of what qualia are; and on the other hand, they’re supposed to be the most immediately known and understood aspects of the world, and hence not to need any explanation. Talk about ‘representation of (e.g.) color’ as the basis for the projection is currently the most popular option, but again it makes no sense. The only theory of representation that anyone has been able to think of is a causal theory. But with no colors ‘out there’ to cause the representations, and no colors ‘in here’ to cause them, we have no way of explaining what it means to talk about representations of color at all.

We need something better than these tired models. The second question is whether the externalist approach I recommend is the only alternative. I think it would be great to explore further possibilities. What are they?
Abstract: Voluntary actions are often defined as actions that are internally-generated, rather than directly triggered by an external stimulus. The capacity for voluntary action gives control of human behaviour a 'freedom from immediacy' (Mike Shadlen's term), that other animals may lack. But voluntary actions are also characterised by a special relation with conscious thought. On a classical, rationalist model, we consciously deliberate, form conscious intentions, and these drive our actions. The crucial link in this chain is the transition from mind to body, when an intentions-in-action is transformed to a motor command, and a bodily movement. I will discuss a number of studies of this process. First, I will consider whether the experience of being about to act is a direct readout of ongoing neural preparation, or a retrospective narrative to explain our actions post hoc. I will then ask the same questions about sense of agency - i.e., the feeling that our actions cause events in the outside world. Both prospective and retrospective components are shown to exist. The retrospective component presumably aims at providing a coherent and description of our own behaviour and self-consciousness. The prospective component is harder to account for, and I will consider two possible functions. First, being aware of what we are about to do just before we do it might contribute to the control or veto of action. Second, it might improve complex instrumental learning. Both accounts suffer from the normal difficulties of ascribing causal roles to consciousness, and the existence of prospective aspects of intention and agency cannot save concepts of 'conscious free will'. Finally, I will consider the implications of recent work on action awareness for moral and legal responsibility.


Comments invited
Posted by Stevan Harnad

24 comments:

Maxwell J. Ramstead 3 July 2012 13:57
Doctor Haggard's research seems to illustrate the fact that conscious agency, whether prospective or retrospective, still happens because of dynamical decisions made by groups of neurons. "Free will" and conscious action thus seems to be effects, and not causes. This is very problematic for anyone who has done Action Theory. Indeed, it points to the idea that mental events cannot cause anything: conscious volition and conscious agency are instead both caused by action selection processes. Even if the feeling itself emerged at exactly the same time as the decision was made to act in a given way—as an identity theorist would have it—it still remains that the felt experience itself would have no incidence on my actual behavior. My felt agency would merely be epiphenomena of "intentional fluency." Given that the feeling of agency seems to be correlated to decisions made by ensembles of neurons which coordinate motor behavior, I am left with the feeling that "free will" (or mental causation) is an elaborate illusion.
A fascinating talk. Many thanks.

Patrick Haggard 4 July 2012 14:48
Thanks. Action selection is interesting philosophically because it is counterfactual. I did A but could have done B. Experience seems to be made at the point where the brain chooses between these alternatives, and I think that's a clue that experience may be part of a mechanism for improving the brain's choices.

Martha Shiell 3 July 2012 14:55
Haggard mentioned the example of epilepsy patients feeling an urge for an action when certain cortical regions are stimulated during surgery. The patient reports her conscious experience, and she cannot see or sense what areas are being stimulated. If her report did not reflect a real urge (because she is actually a zombie, incapable of feeling this urge), then she would not respond in a reliable way to this stimulation. Imagine we had a standard map of where this urge could be elicited: could it be a new test for consciousness?

Félix Mongeon 3 July 2012 21:02
A zombie could be program to do any reliable or unreliable answer to mimic humans, but this would not anything about its feeling.

Martha Shiell 5 July 2012 18:18
But the zombie would still need some kind of input to know what behavior to mimic. If it cannot see the stimulation, and it cannot "feel" it (in a "touch" sensory receptor sense, since there are no sensory receptors in the cortex) then it could not be programmed to give the proper output behavior (reporting the conscious experience).

Camelia 3 July 2012 17:13
I want to understand if we can say precisely, what brain areas are responsible for agency. May be Dr Hallgard already discussed about this fact and I don't remember it.

Actually, I try to understand that the agency are not an impairment in autistic persons because, some brain areas responsible with this functioning are touched.

Thank you to help me to understand.
(Camelia Dascalu, Paris 3 University)

Félix Mongeon 3 July 2012 21:00
To answer your question, Patrick Haggard demonstrated that feeling of agency could be reduced by perturbing the activity of angular gyrus, which is part of the parietal cortex.

I am not sure to understand your question or reflexion about autism.
Furthermore: we know that damage to the SMA also leads to perturbed sensations of agency, like the anarchic hand syndrome, where you move although you didn't want to. Also, regarding the sense of agency the literature suggests involvement of the SMA, premotor cortex, inferior parietal, super temporal sulcus, dorso-lateral prefrontal cortex, etc. … Not to forget the cerebellum and basal ganglia. So, we can conclude that the brain is active during the sense of agency. A nice summary you can find by Nicole David et al, 2008 in Consciousness & cognition I think.

Also, remember that the inferior parietal cortex might be rather signaling the "not-me"-ness of an action. There is also a study showing that the higher the temporal discrepancy is, the higher the activity of the inferior parietal cortex is.

Camelia 3 July 2012 17:15
sorry, I must clarify some statement: that the agency are an impairment because some brain areas are touched.
thank you

Izabo Deschenes 4 July 2012 09:06
When I was first reflecting on Dr. Haggard’s talk, I thought it was odd that when primed, the subject’s felt they were more in control of their decision, even though it seems they were influenced by the primed stimuli (less control). However, one question that was brought up at the end of the talk, was about that maybe because we have more information, we actually unconsciously take that information into account and that is why we feel more in control. Which view would you agree with? Are we actually taking more information into account that we are not aware of and then feel more in control, or is it more in the sense that there is less conflict in our decision and we feel more confident, therefore more in control? (perhaps a way to relate this to Dr. Morsella’s talk and conflict resolution in consciousness)

Would there be any way to prime a robot in the same way that we can prime a human? Would the robot take this information into account? Could they tell us that they had not seen/been aware of the primed stimuli or would robots be aware of everything we showed them?

Patrick Haggard 4 July 2012 14:54
The questioner pointed out that agency may increase as evidence increases: that’s a clever point, and suggests that agency should = certainty. I’ll need to think about how to test that experimentally. Experts often make decisions and select actions based on very little evidence, but they can feel a strong sense of control over the situation; one example would be quality control decisions on an assembly line. The thinnest suspicion of a tiny defect in the product does not stop you feeling in full control when you stop the line.

Ana Pesquita 5 July 2012 06:23
Looking at Patrick Haggard’s talk in the context of pragmatic representations (Paul Cisek ) brings forward the question of the relationship between sense of agency and reward/punishment. Does the outcome of one’s actions influence the sense of agency? From an adaptive view it seems plausible that reward/punishment would enhance the sense of agency (maybe reward and punishment would influence sense of agency in different ways). In this note, does the motivational baseline of the organism bias the sense of agency? e.g. depressed individuals tend to feel less control over their environment.

Diego Mendoza-Halliday 27 July 2012 09:27
Ana, I think there is a difference between agency and sense of control of the environment. I can feel like I totally own certain behaviors and yet feel like I these behaviors don’t allow me to control my environment. There may be a link between the two, but I still think they’re dissociable concepts.

Noemi Stern 5 July 2012 07:59
I don’t know what it’s like for others, but for me, self-inflicted pain is easier to endure than pain inflicted upon me by others. When I pinch myself, and I start off softly and squeeze progressively harder, the fact that I can hold on for longer than when my friend does the same exact thing to me - is this due to the sense of control I believe I have?

Ana Pesquita 5 July 2012 09:19
What you are describing seems to be an attenuation of self-produced tactile stimulation due to the sensory predictions made by an internal forward model of the motor system" http://journals.lww.com/neuroreport/Abstract/2000/08030/Why_can_t_you_tickle_yourself__2.aspx
I think that in the diagram that Haggard showed about sense of agency, sensory-motor contingency in action was “part” of the prospective/retrospective error computation that would result in the sense of agency. But I guess this is not the defining characteristic of sense of agency. One can imagine “sense of agency” without sensorial feedback, e.g. brain-computer-interfaces.

Roxane Campeau 12 July 2012 11:18
POSTED on FB
Roxane Campeau
How the “prospectivism” of Haggard does invalidate the “retrospectivism” of Dennett? To call the retrospectivism “confabulationism” is clearly a statement of invalidation, but I dont understand why cant we consider both like two sides of the same coin...?

Martha Shuell
My impression of Dennetts retrospectivism was that it applied to our awareness of sensory experiences, while Haggard is talking about awareness of decision making. Are they the same thing?

Roxane Campeau
Retrospectivism and prospectivism = access to C?
ANDY NDK
Well Haggard makes the point that these judgments of agency or control are done on a prospective basis, so pre-feedback, which is a bit against the typical model that the match between the predictive component and the feedback arising from that action. However, I don't know much how Dennet framed it exactly.
2 juillet, 11:27

Pauline Claude 16 July 2012 08:19
POSTED ON FACEBOOK BY DIEGO MENDOZA-HALLIDAY:

"ON VOLITION. Here's an explanation to why we seem to own our decisions more when we're subliminally primed towards one: Maybe when there are factors that bias our decision (be subliminal or consciously accessed), the decision becomes easier and thus we think we own it because of the feeling that there must be reasons why we're drawn to one choice more than the other. In contrast, if the decision is totally random because there is no factor that biases our decision, the choice becomes based on totally random processes in the brain, which feel like we don't own them. This resolves the apparent irony."

Laurence Dumont 16 July 2012 08:22
"The impression of certainty surely contributes a great deal to agency in that sense"

Pauline Claude :
"I don't think the decision we make when there is no factor that biases them are based on random processes in the brain. Let's take aplysia to explain my point. Neuronal processes rely on mechanical principles that are the same in every single living species with neurons. As shown ans explain by Prof. Sossin in aplysia (and then in all other species with neurons), to be fired, neurons need a starting point, a stimuli that will start a series of biological reactions. The stimuli that will trigger choices for apparent random decisions might be unconscious, but it has to have one, otherwise neuronal firing will never occur."

Alexandre Duval 16 July 2012 12:03
Very interesting! Dr. Haggard mentioned at the end of his talk that schizophrenic patients were not 'fooled' by the subliminal priming in the 'free choice' part of the experiment (as opposed to normal subjects). In other words, their sense of agency was similar when their choice was incompatible with the prime and when it was compatible. I am not in psychology and I am not familiar with the literature on schizophrenia, but is there an obvious explanation as to why this would be the case? Or, if not, could results like this potentially help us understanding some of the mechanisms responsible for schizophrenia?

Diego Mendoza-Halliday 27 July 2012 09:23
ON VOLITION. Here's an explanation to why we seem to own our decisions more when we're subliminally primed towards one: Maybe when there are factors that bias our decision (be subliminal or consciously accessed), the decision becomes easier and thus we think we own it because of the feeling that there must be reasons why we're drawn to one choice more than the other. In contrast, if the decision is totally random because there is no factor that biases our decision, the choice becomes based on totally random processes in the brain, which feel like we don't own them. This resolves the apparent irony.

Laurence Dumont 29 July 2012 19:02
I am wondering how agency of automatic behaviour such as habits is built... Would it be only a retrospective judgement, a generalization of intention across time? I guess it would differ a lot if it is a desirable habit (brushing your teeth after a meal) versus an undesirable one (biting your nails)

Nico Sheppard-Jones 31 July 2012 22:44
I am trying to disentangle volition and consciousness during sleep, and I am wondering if any parallels can be drawn between retrospective dream recall and the proposed role of the retrospective element of volition.

Pier-Éric Chamberland 1 August 2012 16:40
COPYED FROM FACEBOOK:

Pier-Éric Chamberland:
Isn't ironic that subliminal priming increases the experience of agency, since traditionnaly, priming has been used to influence subjects? I do understand that it is the subjective experience itself, as if the person already knew what to do

...Or do I confuse the feeling of agency with free will, the doing vs the willing?

In Professor Haggard's experiment, concurrently to intentional fluency, did the primed subject were less exhausted? Did the subjects do other tasks after the experiment where they had impeded performance?

Or, did the not primed subjects felt the experiment was more effortful, compared to primed subjects?

David Freedman : Brain Mechanisms of Visual Categorization and Decision-Making

David Freedman Brain Mechanisms of Visual Categorization and Decision-Making

VIDEO
Abstract: We have a remarkable ability to recognize the behavioral significance, or category membership of a wide range of visual stimuli. While much is known about how simple visual features (such as color, orientation and direction of motion) are processed in early stages of the visual system, much less is known about how the brain learns and recognizes categorical information that gives meaning to incoming stimuli. This talk will review a series of neurophysiological and behavioral experiments aimed at understanding the neuronal representations underlying visual categorization. We have found that the activity of individual neurons in both the posterior parietal and lateral prefrontal cortices can reflect the learned category membership of visual stimuli, and that these two areas play distinct roles in category-based decision making.


Comments invited

Posted by Stevan Harnad
Shimon Edelman: Being in Time

Shimon Edelman  Being in Time

VIDEO

Abstract: Philosophical and computational considerations, along with neurobiological data, suggest that phenomenal experience is holistic in the sense that it emerges from the dynamics of the entire brain. On this account, your experience of the page in front of you (say) is predicated upon coordinated activity, not just of visual areas alone, but of the rest of your brain as well. Experience thus must be inherently temporally extended, if only because coordination requires time. What is the nature of this coordination and how much time does it take for experience to emerge? Lessons from the science of parallel distributed computation suggest that putting experience — or, for that matter, any other collective action such as decision making — on hold until after all of the brain's constituents have had a chance to reach a consensus about it is a recipe for permanent functional paralysis. To understand why the brain does not have to wait for long (let alone indefinitely) to figure out what experience it is having, we must note that coordination, like experience that emerges, is an ongoing endogenous process modulated by input, rather than a transient ripple in an otherwise quiescent medium. Thus, the input-influenced present turn of the system's trajectory through the activation space — the embodiment of experience — is shaped collectively by the system's history, which likely possesses a variety of natural time scales amenable to empirical investigation.


Comments invited

Posted by Stevan Harnad

14 comments:

Stevan Harnad  2 July 2012 09:17
DANCING IS JUST SUM OF DOINGS — FEELING IS NOT

Shimon will give a hypothetical model in which every discriminable JND (Just Noticeable Difference) in feeling space has a counterpart in neural doing space.

(Shimon is a brilliant theoretician, and similarity is his specialty, to which he has made very important contributions.)

Trouble is that JNDS (psychophysical judgments) are doings. So are neural doings. So a perfect isomorphism between JND doings and neural doings is just doings/doings.

JNDS also feel like something. Shimon's correlation holds there too.

But the hard problem, which Shimon misses, is how and why JND doings feel like anything at all.

Stevan Harnad  2 July 2012 21:01
SHIMON EDELMAN:
(Tried to reply to Stevan's comments on my talk on the blog, but it refuses to accept my text, so here it is.)
I was thinking about the relation between feeling and doing, when it occurred to me that perhaps feeling is a kind of doing. Indeed, as Doctor Edelman has suggested, perhaps feeling really amounts to the temporal, dynamical dimension of a kind of doing. As a materialist, I would assume that feeling requires a neurological (or at the very least material) basis: only physically implemented systems can have feelings. Now, even if we cannot determine precisely what function is accomplished by feeling, and a fortiori cannot define the exact causal mechanism by which feeling is realized, it remains that feeling must be somehow related to the material substrate. As we tried to explain in our C&C paper, the more the space of trajectories of a system has a parametrically scale-persistent, intrinsically nontrivial ‘(w)holey’ structure, the more its doings are feelings. This hypothesis explains a bunch of empirical findings, and it also satisfies a bunch of prior logical constraints (such as being intrinsic and computable), again as we discuss in the C&C paper.

Steven Harnad:

If I could buy the in-principle validity of an explanatory move — by someone whose work I admire — that claims identity between feelings and the dynamics of systems that meet certain mathematically defined criteria. If you buy the in-principle validity of such a move, the rest is details, which I can try to explain. If you don’t, this saves me the need to spell out the details :-)

I am sure the space of trajectories of a system with parametrically scale-persistent, intrinsically nontrivial ‘(w)holey’ structure, the more its doings are feelings. With 6 papers (including yours) to follow, plus dozens and dozens of real-time commentaries to monitor and respond to, it would be a real help if you could explain this intriguing transition to me!

SHIMON EDELMAN:

As to the call for a simplified explanation of our C&C paper: in a nutshell, it’s an explanatory move that claims identity between feelings and the dynamics of systems that meet certain mathematically defined criteria. If you buy the in-principle validity of such a move, the rest is details, which I can try to explain. If you don’t, this saves me the need to spell out the details :

Steven Harnad:

I said in my talk that the total state of a distributed system is a fiction that can only exist for an external observer, for the simple and incontrovertible reason that instantaneous communication is impossible (as per Einstein’s Special Relativity, let alone in a system such as the brain, where transmission speeds are far, far below the speed of light). Wolf Singer’s data pertain, of course, to just such an external observer of the system, which, moreover, can only formulate its conclusion (that two events happened simultaneously) post hoc, not in real time. It must also be noted that the mechanisms for neural coordination that appears to an outsider to be “zero-lag” are not at all mysterious (nor do they violate Special Relativity): if two neurons fire at the same time, it is because they are driven by a third one (via equal-delay axons, or whatever). In any case, as Wolf would agree, I think (we discussed these matters briefly), his data do not contradict my view of the role of dynamics in generating intrinsically structured representation spaces, and thereby what the system in question experiences as feelings.
And, perhaps unlike Doctor Harnad, I do not think that adopting a such non-dichotomous position (that is, supposing that “feeling” is a kind of “doing”) amounts to mere dismiss of the question.

Romain Vincent  5 July 2012 09:36
Actions are driven by intentions. But when someone argues that feeling is a kind of action, I don’t know which kind of intentions is involved (and furthermore I can feel without performing exploratory movements...).

Carey YL Huh  3 July 2012 20:01
After Dr. S. Edelman’s talk, which neural activities make it into phenomenal experience? I get that silent neurons contribute to the ‘holey’ trajectories, but what about inhibitory neurons which are often quite active during brain rhythms etc.? Do cells have to be computing cells to be part of consciousness or could they also be modulatory ones too?

Dr. S. Edelman’s reply:
First off, everything that makes up a brain computes (have a look at my “Computing the Mind”, Oxford U Press, 2008). The rest of the question is problematic: cut out part of the brain, and the functioning of the rest will change, including the phenomenology that it generates.

Carey Huh:
Thank you Dr. Edelman. I also would like to know whether you equate the neural correlates you refer to with phenomenal experience (___ is experience) or rather you are saying that the neural correlate generates it (___ generates experience). The latter implies a causal relationship and could we have even a delay between the two processes (correlate occurs before the experience, though I am not sure if we are able to measure this delay?).

Dr. S. Edelman’s reply:
The former (which means that metaphysically I am fully committed to the identity stance; I explain my view of the role of metaphysics in science here http://kybele.psych.cornell.edu/%7Eedelman/Edelman-on-Shanahan.pdf and here http://kybele.psych.cornell.edu/~edelman/Edelman-six-challenges-FTPP12.pdf )

Carey YL Huh  6 July 2012 17:45
Dr. S. Edelman explicitly stated in his talk that there is no such thing as zero lag. I wonder what he means by this, since Dr. Singer described at least 3 mechanisms for zero lag in neural synchrony during his talk?

Stevan Harnad  7 July 2012 18:44
SHIMON EDELMAN: Tried to respond to the latest comment on my talk on the Blogspot site, but it keeps rejecting me (even though I have both a Google ID and a Blogspot one). So, here’s my comment, in response to Carey YL Huh :

I said in my talk that the total state of a distributed system is a fiction that can only exist for an external observer, for the simple and incontrovertible reason that instantaneous communication is impossible (as per Einstein’s Special Relativity, let alone in a system such as the brain, where transmission speeds are far, far below the speed of light). Wolf Singer’s data pertain, of course, to just such an external observer of the system, which, moreover, can only formulate its conclusion (that two events happened simultaneously) post hoc, not in real time. It must also be noted that the mechanisms for neural coordination that appears to an outsider to be “zero-lag” are not at all mysterious (nor do they violate Special Relativity): if two neurons fire at the same time, it is because they are driven by a third one (via equal-delay axons, or whatever). In any case, as Wolf would agree, I think (we discussed these matters briefly), his data do not contradict my view of the role of dynamics in generating intrinsically structured representation spaces, and thereby what the system in question experiences as feelings.

Alexandre Duval  14 July 2012 11:18
(Originally posted on FB. I am reposting it here only for credits. My question has already been answered.) Dr. Edelman said at one point in his lecture that he abandoned the identity theory (as defended by people like J.J.C. Smart among others) to embrace a theory inspired by dynamics system theory that considers states of the whole brain over time. But I am not sure that identity theorists (or token identity theorists anyway) would really deny that. Dr. Edelman’s proposal to consider the dynamics of the whole brain over time is not really against the spirit of the identity theory. Sure, identity theorists often used the claim that “C-fibre firing = pain” as an example of the type of identity they had in mind. But as long conscious mental states are identified with brain states (be they states of the whole brain over time or brain states localized in space and time), then his position is compatible with the identity theory. Have I misunderstood him?

Frederic Simard  22 July 2012 12:35
Even though the activity of the brain is temporally distributed, we should not forget that experimental protocol aims at studying clear transitions between brain states. Usually an experimental protocol will have a initiation phase, during which we clear any previously ongoing computation/brain states, so that the brain is in a “known” state or fixed initial condition. Then we proceed with the execution of the task that will bring the brain from its initial condition to a second state. It is during the transition period that most of the scientist record their data (as far as I know). Further, most of them don’t neglect temporal information... Not a critic on the talk, just a comment.

Laurence Dumont  31 July 2012 18:36
I think that Edelman’s point was not about that kind of temporal resolution. You talk about changes that occur in the length of an experiment, while (as I understand it at least) his view requires to examine the changing state of the brain at a finer level, as it unravels through time. Again, from what I get, it is this ever changing state that could be key in solving the issue we are debating in this institute.

Wayne Sossin   : Aplysia: If We Understand the Cellular Mechanisms Underlying Sensation and Learning, What Do We Need Consciousness for?

Wayne Sossin   : Aplysia: If We Understand the Cellular Mechanisms Underlying Sensation and Learning, What Do We Need Consciousness for?

VIDEO
**Abstract:** Aplysia is a model system for defining the relationship between neuronal plasticity and behavior. Indeed, many of the circuits underlying Aplysia’s simple behaviors are understood, as well as how the animal can change those circuits after experience. Moreover, it is beginning to be understood how biogenic amine and neuropeptide pathways can activate or inhibit distinct motor programs to bias the animals decisions on what to do. I will explore, given the limited number of neurons in Aplysia, whether the additional pathways are present that would lead to the complex feedback systems that are probably required for consciousness.


**Comments invited**

Posted by Stevan Harnad

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32 comments:

**Adele Tufford**  2 July 2012 17:29

Wayne did a fantastic job of laying out distinct criterion for consciousness, and following this with a careful review of each criteria in his model organism- the first of all speakers to coherently do so.

I believe, however, that he left out the criterion of agency. Before this point though, i do also think it possible that Aplysia could satisfy the requirements for consciousness by it having recurrent states of electrical activity. By nature of it having a circadian cycle of action and rest states, it seems as though it has some primitive form of volitional drive to feed & reproduce. It remains 'online', ready to receive sensory input, and send behaviour.

On the sense of agency: Aplysia carries out some of their stereotyped behaviours with the 'belief' that the behaviour will affect change in their environment. Squirting ink will ward off predators, and releasing hormone will attract a mate.

Yes, the Aplysia is a reductionism model - but i don't think anyone would disagree that our volitions and beliefs are wrt (somewhere) in our circuitry. As Haggard suggested, we are just more complex marionettes with more higher-order strings acting on our Aplysia-esque strings.

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**Wayne Sossin**  3 July 2012 10:03

I agree that this was a very interesting talk, and whether one agrees or disagrees with Wayne’s conclusion regarding Aplysia’s (lack) of consciousness, he identified in a clear and accessible manner the criterion used to substantiate his position and foster further discussion. Throughout the symposium so far, differing perspectives on a definition of consciousness has been the inadvertent root of many debates, precluding deeper discussion of its limits, putative functional roles, etc.

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**Romain Vincent**  3 July 2012 09:59

Most of the commentaries following this talk were aiming aplysia’s degree of freedom (its ability to make decisions vs. its pre-programmed behaviors) and/or the aplysia’s ability to feel. If aplysia was conscious in any way (and maybe it is), I don’t think these two features refer to a unique kind of consciousness. Maybe the ability to feel refers to a minimal kind of consciousness (1) something like a readiness to encompass environmental constraints) but the notion of freedom refer to the ability to take notice of it’s own reactions which is a higher kind of thoughts (2). Where (1) in aplysia seems quite uncontroversial, I think we have no evidence for (2) - and (2) is the real deal.

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**Wayne Sossin**  3 July 2012 10:14

I agree, but am not sure that robots could not be programmed to be ready to encompass environmental constraints. I think one of the keys of the consciousness
The nervous system does not seem to contain feedback loops does not argue against its having feelings. While Aplysia certainly is not self-conscious, there may very well be "something it is like" to be an Aplysia. I would argue that the mere fact that Aplysia's nervous system something about itself. Sossin hinted at the possibility that such a state requires the possibility of predicting the next input, and the capacity to plan ahead. While certainly, some aspects of our human consciousness have these reflexive features, I would argue that the latter are not the "mark of the felt," if you will. It seems to me that experience does not necessarily entail a homunculus, or a subject for whom the feelings are experienced, as Sossin seems to suggest.

Maybe some phenomenology could be of use here. (Apologies to those of you who dislike phenomenological "jazz hands.") From a Husserlian point of view, there is no need for a homunculus, as felt experience merely has two aspects: an "ego-pole" and an "object-pole." There is only the phenomenon of experience, and this experience has distinct features. The fact that experience seems to happen to a subject is merely a feature of our human experience, one that is probably realized by feedback and reflexive processes. However, when we speak of feeling proper, there need not be a homunculus, nor a subject "doing the feeling," as it were. In the case of our human awareness, there is indeed a formal aspect, a kind of "mineness," that is, the aspect of a feeling that makes it seem as if it was happening "to me." Mineness is simply a feature of our human experience, and IMHO, it may not be a feature of the feelings of other species.

The "mineness" of experience could very well be explained by recursive processing, as Sossin speculates, but my point is that experience need not be so structured. It could very well be that experience and "mineness" are indeed related in our own, typically human, type of experience, whereas the experience of more simple life forms may not require such a centralized representation.

What if consciousness is not a computational property, as Doctor Sossin has argued? Is it not possible that Aplysia is apt to feel, despite the apparent simplicity of its nervous system? While Aplysia certainly is not self-conscious, there may very well be "something it is like" to be an Aplysia. I would argue that the mere fact that Aplysia's nervous system does not seem to contain feedback loops does not argue against its having feelings.
for consciousness? Not sufficient for consciousness, what is the simplest animal that could have a consciousness? Could this be a point to understand the necessary and sufficient conditions?

Sossin told in his talk that it is difficult to measure consciousness in animals separately from action. Was he talking just about motor action? If aplysia’s neural system is not so complex to understand, could aplysia still not learn to seek that particular context?

Klara Kovarski

I wouldn’t eat an aplysia, but not for the same reason...

Second order feeling, but not a felt feeling, rather a feeling about feeling.

Some might add reality, but aren’t we all declared materialists?

2- perception, and

"Consciousness is knowing that perception is a representation of reality". Of course that begs the question(s); at least three questions about 1- knowing, 2- perception, and 3- representation.

Some might add reality, but aren’t we all declared materialists?

So, let me try again: "Consciousness is feeling that our feelings are (causally) related to a physical reality". Second order feeling, but not a felt feeling, rather a feeling about feeling.

I wouldn’t eat an aplysia, but not for the same reason...

Sarah Etezadi

The idea of using light/dark chambers (or light/dark paths in a y-maze) is a great one to potentially access the possibility of a sort of higher-order learning of the aplysia. I have no idea if it would work or not, since I am not familiar enough with the aplysia, but I can offer some speculation. We know that the aplysia can learn from experience and that it is probably sensitive to light, so if it is also sensitive to spatial location then it should work. I wonder what it could have that would help it to learn spatial location though. Without a finely tuned visual or auditory system, where would the required spatially selective neurons be getting their input? I guess it would be possible to create a mental map of the environment using only tactile sensory information - maybe a different texture on the walls of the two sides of the maze... it would definitely be an an interesting experiment! That being said, I suspect that such an experiment would not shed further light on the question of aplysia consciousness, though...

Carley YL Huh

Yes, tactile stimuli may be interesting!

Adele Tufford

Great points. I think reductionism is key. In the search for the causal origins of consciousness, if we are to critically assign definitions, these crazy molluscs are the perfect place to be looking.

For me, where the black cloud of ambiguity keeps coming up is in defining what it is to feel (not HOW or WHY organisms feel but WHAT it actually is). Using overt behavior as a measure of internal processing, I see no reason why Aplysia’s sensory circuitry does not constitute feeling - it simply operates on a reduced biological circuit.

Tail shock --> internal computation (the magic!) --> behavioural output

WE feel we feel, an Aplysia just feels.

I wonder what Skinner would think of Aplysia?

Roberto Gulli

"It seems to me that experience does not necessarily entail a homunculus, or a subject for whom the feelings are experienced, as Sossin seems to suggest."

I certainly disagree with you, as would Searle and every other scientist and philosopher who would consider subjectivity to be a fundamental component of consciousness or feeling. You’ve stated clearly that you do not belong to this group, and believe consciousness/feeling can exist without subjectivity, so I would be interested to hear your elaboration on what you suppose it may feel like to be an Aplysia without subjectivity. This concept seems inextricable from a scenario in which an unconscious organism/system/robot operates in an environment in an entirely reactive manner, providing the appearance of awareness but lacking any subjectivity or intentionalality.

Pierre Vadnais

Wayne asked: "If We Understand the Cellular Mechanisms Underlying Sensation and Learning, What Do We Need Consciousness for?"

"Understanding the cellular mechanisms underlying sensation" means understanding the neural causal chain starting from an external stimulus through a sensor (physical-to-neural transducer) through a multitude of interneurons (neural-to-neural) through an effector (neural-to-physical transducer) to an external action. Makes me think of a Rube Goldberg machine.

"Understanding learning" means understanding how neural causal chains change under utilization. More Rube Goldberg machines.

And Wayne tells us that this is all there is in an aplysia. However, at some point he mentioned "spontaneous firing" of some neurons. Well, there is nothing "spontaneous" in an RG machine. These neurons are firing for a reason, a causal chain needs a cause. These neurons are sensing internal conditions. They could be nocioceptors. Maybe the aplysia had a ganglionache, not to say a headache. Is that sufficient to say that it felt a ganglionache? It certainly sensed something. Were it conscious, it might interpret it as a ganglionache, but it has no interpreter. Interpreting means going one step beyond sensing, identifying the cause of the ganglionache. Aplysia doesn’t know anything about causes, it just feels the effects. Whatever applies to aplysia applies very far up the mammalian evolution chain and certainly applies to robots.

On my poster, I wrote:

"Consciousness is knowing that perception is a representation of reality". Of course that begs the question(s); at least three questions about 1- knowing, 2- perception, and 3- representation.

Some might add reality, but aren’t we all declared materialists?

So, let me try again: "Consciousness is feeling that our feelings are (causally) related to a physical reality". Second order feeling, but not a felt feeling, rather a feeling about feeling.

I wouldn’t eat an aplysia, but not for the same reason...

Sarah Etezadi

The idea of using light/dark chambers (or light/dark paths in a y-maze) is a great one to potentially access the possibility of a sort of higher-order learning of the aplysia. I have no idea if it would work or not, since I am not familiar enough with the aplysia, but I can offer some speculation. We know that the aplysia can learn from experience and that it is probably sensitive to light, so if it is also sensitive to spatial location then it should work. I wonder what it could have that would help it to learn spatial location though. Without a finely tuned visual or auditory system, where would the required spatially selective neurons be getting their input? I guess it would be possible to create a mental map of the environment using only tactile sensory information - maybe a different texture on the walls of the two sides of the maze... it would definitely be an interesting experiment! That being said, I suspect that such an experiment would not shed further light on the question of aplysia consciousness, though...

Carley YL Huh

Yes, tactile stimuli may be interesting!
their action? Is there anything as being conscious of moving, of eating, or whatever action aplysias do in real life.

I think your question is very interesting, but yes, even in human, it's hard to separate consciousness from action, because even the NCC, the neural correlates of consciousness, as described by A. Shmuel's talk, are not empty of action (people think, feel, fear, etc.).

Marjorie Morin 25 July 2012 13:00
Originally posted on facebook
ERIC MUSZYNSKI
Sossin: "[Aplysia have] no need for firing in the absence of inputs" - could this be a clue to our self-awareness? Our neurons are supercharged and MUST discharge even in the absence of stimulus or motor control, so it accidentally turned into self-awareness... It would then be just a spandrel of our powerful brain? No function needed to explain it.

Marjorie Morin:
It's a very interesting point. He said that consciousness may require a certain minimal brain size. If we follow your logic it might not be the size of the brain as much as how much it is "occupied" by what it has to process that could bring consciousness?

Diego Mendoza-Halliday 27 July 2012 09:28
PLANNING AND CONSCIOUSNESS: Sossin claims that planning is a feature of being conscious. I strongly disagree. Planning is an additional function that consciousness allows, but an animal can be conscious of its present and yet not have any ability to plan beyond the close future.

Diego Mendoza-Halliday 27 July 2012 09:35
Sossin also says that you need memory to be conscious. We are conscious because we have memory. I disagree. If I could impair my memory formation (that longer than the order of seconds), I could still be conscious of my present at every moment, even if I cannot access my conscious experiences from the past.

Nico Sheppard-Jones 30 July 2012 21:39
The fact is, however, that every organism that we seriously consider attributing consciousness to possesses memory. As a result, any serious attempt at building a theory about consciousness cannot disregard the role of memory. Sure, HM had severe anterograde amnesia, as well as some retrograde amnesia. But he still had some remnants of working and procedural memory, which are the systems that 'feeling', or consciousness as an all or one phenomenon, are most likely to tap into. Thus, I tend to side with Dr. Sossin.

Izabo Deschenes 30 July 2012 19:58
I agree with Diego! I think the example of HM was brought up in another discussion, but as was mentioned I don't think anyone would agree that he was not conscious, although lacking long-term memory and probably the ability to plan beyond the close future.

Also, I really enjoyed Dr. Sossin's strong point of view, though some might consider he oversimplified things, I thought he made some great points. Furthermore, when thinking back on aplysia in comparison to other animals that have been discussed during the summer school, I was wondering what differs, that could be related to consciousness, between for example an octopus and an aplysia. Do people who consider octopi conscious, also consider, by the same criteria, aplysia conscious? Or do some people consider octopi conscious, while not attributing consciousness to aplysia? Would Dr. Sossin consider octopi conscious?

Jennifer Robinson 31 July 2012 10:08
I was very convinced by Dr. Sossin's definitions of animal consciousness, especially the behavioural aspect of rich discriminatory abilities. I think this was a great point which Dr. Sossin briefly touched on, without the appropriate sensory and integration abilities, an organism is unable to conscious of its present situation. I do agree with the above discussion that planning may not be a necessary for a basic level of consciousness, that an organism may be conscious of the present without necessarily having the ability to plan beyond the near future.

Laurence Dumont 31 July 2012 17:58
Short question, but I think it is a legitimate one...
If consciousness is a continuum, how can we give criterion for it and why would it be a black or white question? I am not necessarily talking about feeling there. To now, I don't think we've come up with any operationalizable criterion (or even definition that goes beyond one's own feeling) to the question of feeling.

Stevan Harnad 5 August 2012 16:46
HOW MUCH YOU FEEL IS A CONTINUUM -- WHETHER YOU FEEL AT ALL IS ALL-OR-NONE
If you prefer it in "consciousness" lingo: Mow much you are conscious of is a continuum -- whether you are conscious at all is not.
Operationalizable? (Please see the other-minds problem and the Turing Test...)

SUMMARY & DISCUSSION, DAYS I + II
I. Inaugural Day: Turing, Dennett & Damasio (Friday June 29)
Dan Dennett (Tufts) A Phenomenal Confusion About Access and Consciousness
Antonio Damasio (USC) Feelings and Sentience
II. Felt Function (Saturday June 30)
Joseph LeDoux (NYU) The Perplexing Relationship Between Emotions and Consciousness


SUMMARY & DISCUSSION, DAYS I + II

Comments invited

Posted by Stevan Harnad

11 comments:

Pauline Claude 12 July 2012 18:40
DISCUSSION STARTED BY Stevan Harnad ON FACEBOOK:

"No, admitting that we feel does not commit us to a homunculus. Redundance (feeling feelings, accessing feelings, believing feelings) does."

Pauline Claude 12 July 2012 18:43
GUILLAUME LOIGNON:
"As soon as we say that "feelings are felt", a kind of 3rd man argument problem arises, infinite regression and all. Who is feeling the feeling? Who feels that I feel the feeling, and so on?"

MATIAS BALTAZAR:
"That is a very good point. But though feeling feelings is clearly redundant, accessing them or believing in them are different operations that deserves to be isolated to fully understand what it is to simply feel to my point of vue."

Stevan Harnad:
"Access can be felt or unfelt. You don't access feelings, you feel them. You may have "beliefs" about feelings (or about anything) but, again, those beliefs may be felt or unfelt."

GUILLAUME LOIGNON:
"Still, in that model the feeling needs to be felt, and I am still stuck with an infinite regression, homuncular or not."

MAXWELL RAMSTEAD:
"Maybe some phenomenology could be of use here. From a Husserlian point of view, there is no danger of infinite regress. Felt experience instead has two sides to it: an 'ego-pole' and an 'object-pole.' There is only the phenomenon of experience, and this experience has distinct features. The fact that experience seems to happen to a subject is merely a phenomenal aspect of experience. There is no homunculus, no subject "doing the feeling," as it were; there is only a formal aspect of felt experience, a kind of 'mineness,' that is, the aspect of a feeling that makes it seem as if it was happening 'to me.' Mineness is simply a feature of experience, and I do not think it is necessary to reify this feature of feeling into a hypostasis like a homunculus."

Stevan Harnad 2 August 2012 19:49
FEELERS, FEELING FEELINGS...

This is mostly verbal. "Feeling a feeling" is not redundant, any more than tasting a taste is redundant.

Salt tastes like something. It has a taste. To know what the taste is, you have to be tasting salt (or at least be feeling as if you're tasting something salty).

It's part of the nature of feeling (and we all know it) that there is something a feeling feels like. It's a feeling, and to know what it's like you have to be feeling it.

A more interesting question that whether "feeling a feeling" is redundant is whether feeling/feeler is redundant, or tautological.

I think Descartes over-reached with his Cogito ergo Sum: better rendered as "I am feeling, therefore I can be sure that I, the feeler, exist."

All I can be sure of when I am feeling something is that there's this feeling going on, now. Of course the feeling is being felt. But how much does that really entail, before we are lost in theory of "self," "I," etc. and far from the Cartesian certainty that feeling is going on when it's going on?"

Pauline Claude 16 July 2012 08:28
COMMENT POSTED ON FACEBOOK (June, 30th)

"I noticed from today's and yesterday's lectures that it was especially difficult to mix the content of all the speeches because it seems to have huge divergences in the definition itself of consciousness as well as other terms that are related to consciousness such as awareness.

What is consciousness? what does it mean to be conscious? what is the difference between consciousness and awareness? as long as the brain is able to store information by creating images (which seems to be the case for any living being with senses and a memory system), is the fact that the brain know what is going on necessary to create what we call consciousness, or does it need to reach a higher a level of awareness, mainly when an organism is aware of its own body and its environment?"

Pauline Claude 16 July 2012 08:38
POSTED ON FACEBOOK BY Stevan Harnad (June, 30th):

"Notice that if they were asking "do animals feel" the answer would be obvious..."

Pauline Claude 16 July 2012 08:43
Pauline Claude  
"It seems obvious to me that the uniqueness of human species does not rely on our ability to "feel" (which I hardly believe most vertebrate have) but to our ability to translate these feelings into another layer of complexity by giving a meaning to those feelings by association learning, added to higher cognitive abilities, ability to multiply neuronal connection within the different part of the brain and the ability of language?"

Stevan Hamad  
"It's obvious to me that animals feel, but not because of their neuroanatomy. (For most animals I have no idea of their neuroanatomy.)"

Pauline Claude  
"Is that obvious to you because it is an intuition or because you have evidences to rely on? Because, I do have the conviction both based on my intuition and some people's theory of consciousness (especially Damasio's) that animals do feel, but neuroanatomy is just a piece of evidence that makes me believe that my intuition could be true."  
Stevan Hamad  
"My main evidence that animals feel is based on what they do (Turing test...), not neuroanatomy."

Pauline Claude  
"Okay. But is comparative neuroanatomy irrelevant to try to explore the idea of consciousness?"

Stevan Hamad  
"No, of course comparative neuroanatomy is relevant for studying the brain correlates of both doing and feeling. It's just that with doing they will eventually give us a full causal explanation, but with feelings they will just give us predictors, not explanations, even when Dan Dennett's (and Shimon Edelman's) full heterophenomenology has been neurally mapped out: http://users.ecs.soton.ac.uk/ harnad/ TuringEvolutionConsciousness.shtml#_edn18"  
Pauline Claude  
"Anyway, scientific evidence can only give us predictors (more or less strong) but will never give us real explanations as it always have a piece of interpretation and subjectivity."  
Pascal Riendeau  
"As always, a lot of this rests on what theory of explanation we endorse. It's a philosophical problem that's hard to circumvent, and we certainly cannot assume all the presenters endorse (knowingly or not) the same."  

Pauline Claude  25 July 2012 07:04  
Thought related to Mark Mitton's talk:  
Mark Mitton demonstrated us that the way we perceive the the world is far from being a true representation of the world in which we live in. Moreover, it seems to me that the only representation of the world we have has, at some point, to reach the level of consciousness. Is there any possibility that the fact we do not have a true representation of the world might be adaptive?  

Stevan Hamad  2 August 2012 19:53  
POLYSEMY  
Visual illusions, both static and dynamic, may be side-effects of mechanisms for seeing the world veridically: special cases where they lead us astray.  
Or (as Mark would probably suggest), they give us a few more degrees of freedom in how we can see the same things.  

Marjorie Morin  25 July 2012 11:55  
Originally posted on facebook  
VINCENT LEBLANKART:  
I feel a lot of people on this page (including me) do not get the doing/feeling distinction M. Hamad keeps referring to. Could we have a clean definition/delimitation of these concepts, so that we can understand your interventions better and actually argue with you? =)  
Frederic Simard  
I'm replying to the first comment, if everything that is neural activity is doing... What substrate remains to support feeling (or where is it)? (It's a slippery road, I know)  
Marjorie Morin  
I think you get it Frederic. This "feeling" should be in our brain. But it seems like everything that comes from our brain (fear, fear of losing someone you love, loneliness, happiness, greediness, etc, etc) is subject to "feeling", it's a little circular. So where is it? What is it? And I really really want to know why it was necessery for us to have this consciousness. Finding this could help us know if animals do indeed "feel".

Marjorie Morin  25 July 2012 11:56  
Originally posted on facebook:  
"This is for the person who did the comment on empathy and homeostasis in the discussion session. Here is not an answer but maybe some parts of an answer. I think what is much more relevant to this question than empathy is prosocial behaviors that may or may not be triggered by feeling empathy for someone. Most researchers agree that empathy is related to more prosocial behaviors. But we also know that when you do this behavior it's not to alleviate a discomfort you are yourself feeling but is altruistic. So in a sense it seems indeed that you want to help the other person get better (if you think about pain) and so get back to the homeostasis. I don't remember reading that prosocial behavior are more frequent with friends/family than with unknown people, but since we tend to empathise more with people we know and people who we can relate to, I guess it's not a bad idea that the homeostasis of our group as well as ours is important."

Stevan Hamad  2 August 2012 20:02  
THERMOSTATS AND FEELING THE HEAT  
I don't understand what explanatory work the notion of "homeostasis" is doing in any of this?  
Yes, organisms need to breathe, drink, eat, avoid predators, reproduce. So ensuring that these things keep happening can be renamed "homeostasis", but how is that
SUMMARY & DISCUSSION, DAY III

PREVIOUSLY POSTED ON FACEBOOK BY Pauline Claude    (July, 1st) :

"What struck me the most today was how there is so much talk about the basis of consciousness (feeling) and so little phenomenological description of it. If we want to qualify, describe, tease apart the elements of consciousness, we need to talk about verbal reports of what it feels like to be nearly unconscious (eg. fainting, falling asleep), and other fringe states. We need to pay attention to this. As Harnad briefly pointed out, blindsight patients don't report degraded visual stimuli, but a "feeling of awareness".

We are in dire need of more descriptive, first-person vocabulary."  

POSTED ON FACEBOOK BY Pascal Riendeau     (July, 1st) :

"Agreed. So many has been said about conscious state and conscious content but nothing on unconscious content. Why do we have a conscious access to a limited number of contents and why others will never reach the level of consciousness? might the adaptive function of consciousness have anything to do with the fact that the brain seems to separate two kinds of data?"

"Separating kinds of data is not feeling per se"

FELIX GAUTHIER MONGEON :
"Making sense of our experiences is surely important and I even think that it might be the function of feelings in verbal animals (i.e. humans). In fact, supposing that a fundamental drive of our existence is to understand our feelings to develop a clearer sense of the self, then verbal elaboration of feelings might alleviate such a drive by allowing to specify the nature and source of our feelings (even if phenomenological understanding of feelings might be false in a scientific sense). Concerning the lack of phenomenological description of feelings in the talks, I think this is due to the practical constraints. Phenomenology has been most widely investigated in literature and other arts as well as in philosophy and qualitative sciences (e.g. qualitative psychology)."

Pauline Claude    :
"I agree. So many has been said about conscious state and conscious content but nothing on unconscious content. Why do we have a conscious access to a limited number of contents and why others will never reach the level of consciousness? might the adaptive function of consciousness have anything to do with the fact that the brain seems to separate two kinds of data?"

And what about cases of "altered" and other bizar cases of consciousness as described brilliantly by VS Ramachandran in his book "The Tell-Tale Brain" (such as synesthesia, telephone syndrome, anosognosia, out-of-body experiences...) http://www.amazon.com/ The-Tell-Tale-Brain-Neuroscientists-Quest/dp/ 0393077829"

And how and why would homeostasis, even if it nontrivially explained all our doings, explain feeling?

Pauline Claude    :
"No, it's not what I meant. I didn't mean that separating two kinds of data was a feeling itself. I meant that, it seems that, some data will never reach the level of consciousness, they will never be translated into feelings. My question was rather why some processed data turn into feelings whereas others don't. Having feelings allows selective attention and attention allows the brain to focus on attended things. Paying attention to something thanks to feelings increases the biological value on that specific attended thing by, at the same time, disregarding completely all the other potentially-conscious-related stimuli that interact with the organism. So I was guessing if consciousness had evolved because it allowed to process relevant things of the environment and react in real time thanks to feelings, but that at the same time, the brain keeps continuously processing another set of data. This set of data might rely on fundamentally vital function to the organisms (eg. heart beating, oxygen processing...). But as long as the environment starts becoming extremely reach and complex, if the organism had to process any single stimuli from that environment, it would necessitate something to discriminate what is important for survival. Consciousness do select what is important for the immediate survival in a given specific environment simply by increasing the biological value. I don't mean that unconscious processing doesn't produce a biological value but feelings allows to add another layer."
We can begin to sketch out some of the biological costs and benefits of conscious states and their stream of reportable contents. Humans and other animals, as in the case of traffic accidents and predation by ambush. Sleep is a state of high vulnerability among prey animals.

The well-known momentary limited capacity of conscious contents is an example of an information processing cost, while the very large and energy-hungry corticothalamic system makes costly metabolic demands. Limited capacity can cause death and injury in behavioral pros and cons. The unconscious brain events have distinctive biological pros and cons. These involve information processing efficiency, metabolic costs, and accurate memory traces of the same stimuli are not reportable, unless they are specifically recalled. Like other major adaptations, conscious and unconscious brain events have distinctive biological pros and cons. These involve information processing efficiency, metabolic costs, and behavioral pros and cons. The well-known momentary limited capacity of conscious contents is an example of an information processing cost, while the very large and energy-hungry corticothalamic system makes costly metabolic demands. Limited capacity can cause death and injury in humans and other animals, as in the case of traffic accidents and predation by ambush. Sleep is a state of high vulnerability among prey animals.

We can begin to sketch out some of the biological costs and benefits of conscious states and their stream of reportable contents. Humans and other animals, as in the case of traffic accidents and predation by ambush. Sleep is a state of high vulnerability among prey animals.

Consciousness. Subcortical structures like the cerebellum do not. Likewise, attended sensory stimuli are typically reportable as conscious, while unconscious brain events have distinctive biological pros and cons. These involve information processing efficiency, metabolic costs, and behavioral pros and cons. The well-known momentary limited capacity of conscious contents is an example of an information processing cost, while the very large and energy-hungry corticothalamic system makes costly metabolic demands. Limited capacity can cause death and injury in humans and other animals, as in the case of traffic accidents and predation by ambush. Sleep is a state of high vulnerability among prey animals.

We can begin to sketch out some of the biological costs and benefits of conscious states and their stream of reportable contents. Humans and other animals, as in the case of traffic accidents and predation by ambush. Sleep is a state of high vulnerability among prey animals.

Bernard Baars: Psycho-Biological Risks/Benefits of Consciousness

Abstract: Some philosophers maintain that consciousness as subjective experience has no biological function. However, conscious brain events seem very different from unconscious ones. For example, the cortex and thalamus support the reportable qualitative contents of consciousness. Subcortical structures like the cerebellum do not. Likewise, attended sensory stimuli are typically reportable as conscious, while unconscious brain events have distinctive biological pros and cons. These involve information processing efficiency, metabolic costs, and behavioral pros and cons. The well-known momentary limited capacity of conscious contents is an example of an information processing cost, while the very large and energy-hungry corticothalamic system makes costly metabolic demands. Limited capacity can cause death and injury in humans and other animals, as in the case of traffic accidents and predation by ambush. Sleep is a state of high vulnerability among prey animals.

We can begin to sketch out some of the biological costs and benefits of conscious states and their stream of reportable contents.
the brain basis of consciousness and attention.)

Commentary invited

Posted by Stevan Harnad

48 comments:

Bernard J Baars 4 July 2012 08:17
My title has changed, although it is still in the same domain.

It is now

"The biological basis of conscious experiences: Global workspace dynamics in the brain."

Things are coming together nicely.

Bernard J Baars 12 July 2012 12:45
Hi Arnold,

It doesn't matter what we call things, of course, as long as the theoretical terms are clearly tied to observable operations, and as long as they are rigorously defined and mutually consistent.

That being said, we obviously try to use terms that are not far removed from everyday usage, so we can get across more easily.

I think the evidence for BOTH conscious AND unconscious perception (i.e., stimulus representation in the brain) is now very substantial.

I realize that in traditional psychology (going back to Aristotle, who pretty much defined our scholarly usage of psychological terms) the term "conscious perception" sounds redundant, and "unconscious perception" sounds paradoxical.

That's why Helmholtz got into hot water with "unconscious inference" or "unconscious conclusions." The phenomena he talked about were mainly perceptual, I believe, or triggered by perceptual events.

A turning point for me came with the work of Nikos Logothetis (et al) in the 1980s, who tracked stimulus-sensitive neurons in visual cortex using single cell recording (but lots of single cells in each visual area of cortex), in the macaque, whose visual brain is probably the best animal model for the human visual brain. Logothetis carefully recorded in V1, and I think MT (motion), and finally IT (called TE in the macaque), and one or two other places.

The neat thing is that he used binocular rivalry to simultaneously present visual input that the monkey could identify AND optically identical stimuli that the monkey could NOT identify at any given moment. That was hard to do, but we now know of visual tricks that make the rivalry last longer.

To trigger off neurons in V1, you use rivaling points of light that cannot be fused into a single dot (I think that's what it was. It could be spatial grids or something similar). To trigger neurons in MT you can use two escalators moving in different directions, which is really easy to do. (I have a little video off the web that shows it with normal stereoscopic vision). To set off neurons in IT (object recognition) you use two visual objects that are different, and therefore cannot be fused. The monkey responds after a bit of training using "match to sample." For a coffee cup stimulus it points to a different coffee cup on a screen, etc.

So you know what's reportable (conscious) and what's not. (Randolph Blake has done a lot of collaborative work with Logothetis, by the way).

The summary results are:

a. In early visual cortex (before IT), equal numbers of single neurons are firing for both the reportable and non-reportable stimulus. Around 20% I think.

b. In IT, object identification, 90% of the neurons are voting for the consciousness, and no neurons responding to the non-reportable, non-conscious stimulus could be found:

A lot of replication has occurred, mostly indirect, using other brain imaging methods, but that story seems to hold up. Right now that kind of stuff has been done in human epileptics, where it's ethically permissible to do it during exploratory implants prior to surgery. The names on PubMed include Canolty et al, Cerf M et al, Crone et al, and Fried I et al. Koch has also collaborated with others on those studies, which are quite amazing.

The conclusion, supported by a ton of subliminal studies, is that there are indeed unconscious stimulus representations quite far into cortex. In the case of subliminal snake pictures, I think, and scary faces, there seems to be unconscious emotional pattern recognition for the amygdala, and I would think the fusiform face area.

That means we have a 2x2x2.

Conscious vs. unconscious (as assessed by voluntary reportability, checked for accuracy).

Stimulus-driven (i.e., perceptual) vs. endogenous (visual imagery, for example).

Arnold Trehub 11 July 2012 08:37
On the question of the limited capacity of consciousness, I wonder if what you are really talking about is the limited capacity of "perception". If the global content of consciousness in our brain is not limited (as I think it is) then its contents must be every thing that is represented in our phenomenal surround "prior" to the detection of any "particular" objects or events by selective attention; i.e., acts of "perception". If this is the case, then consciousness can be capacious whereas perception would be limited by the constraint of selective attention. What are your thoughts about this?

Bernard J Baars 12 July 2012 12:46
Selectively attended vs. non-attended (using distraction or some kind of momentary overload). Posner's flanking task is a good example of that, where you get attentional shifting without eye movements.

It looks like conscious events happen more frequently with voluntary selective attention. But we also have bottom-up selective attention, as in the case of bright flashes, or the CS in Pavlovian conditioning. So attention is NOT equal to consciousness if you accept those operational definitions.

The most attractive definition of selective attention, I believe, is "whatever enables access to conscious (reportable) experiences."

So those three variables can be teased apart orthogonally.

Bernie
All the selective, focusing and integrative functions of the Global Workspace sound very useful to an active, cognizing organism: But how and why are they felt, rather than just done?

Jules Pelletier 4 July 2012 18:10
Taking into account the Limited capacity paradox, the Global Workspace needs to be discriminated from the rest of the cognitive system. What little there is (1 to 4 elements) in the GW needs to be highlighted from the rest of the sensory inputs or even the cognitive bagage in case of high level reflexion.

In regards to sensory inputs, the crucial info has got to be selected by the organism and drawn to the subject's attention. If most of the sensory input is unconscious, then we need to have the important inputs highlighted. Consciousness might just be the way to do so. Otherwise, we would need another cognitive system to do that precise job. It just might happen to be consciousness.

If we talk about higher level cognition, which is constituted by an enormous background of knowledge, experience and belief, consciousness just might play the same role.

As an example, the mind drifting off in countless directions just before you fall asleep is a semi-conscious reflexion. Fall asleep completely and you will never remember any of it. Wake up and you will have some vague idea of the train of thought you followed. Most probably, that train of thought will make no sense whatsoever, just being an association process.

Then maybe the mind needs consciousness as a guideline for action. Maybe thought-processing isn't possible to work by itself because the reasons we think are beyond our genetic programming.

For example: wasps that feed on beetle larvae know exactly where to strike their darts in order to paralyze the motor nervous centers to protect the fragile pup when it hatches. This precise surgical knowledge is neither learned nor reflexive since it is gene encoded. But besides base reflexes like sucking and grasping in infants, human beings have outgrown the mere genetical encoding's capacity. Evolution has made found another way to get us to survive, and that would be consciousness.

Bernard J Baars 12 July 2012 12:50
I would say that without the dismissive adjectives like "just," etc. It's a wonderful problem, and you don't want to take all the fun out of it. For one thing, there could be more ponies hidden in those woods.

In addition, I haven't dealt with all the aspects of the problem in this one brief presentation. Take a look at the 1988 book if you want to see other insufficiently covered aspects of this particular Mount Everest.

Good luck!

Maxwell J. Ramstead 6 July 2012 13:31
I share Doctor Harnad's concern concerning felt experience itself.
IMHO, the account given by Global workspace theory is one of subjective experience and of information integration. I am deeply convinced that there is something fundamentally right about this approach to consciousness.

However, I am still curious as to what mechanism in the neuronal network could possibly yield the felt, qualitative aspects of the representations having reached global access—not the subjective aspect per se, as first-person perspective, but the actual felt quality of the representations. This remains unexplained.

Bernard J Baars 12 July 2012 12:53
OK — but then it's vitally important to operationalize the notion of "felt sense" in a way we can test empirically. Since we're talking about a huge biological adaptation, with a 200 million year history (the history of mammals, which have the right neural machinery), it is not just floating in a little cloud above our heads...

Maxwell J. Ramstead 14 July 2012 11:06
Thank you for responding, Doctor Baars.
I have been thinking about the problem of operationalizing felt sensation a lot over the past few weeks. It seems to me that the "hard" problem is hard precisely because we have not developed a framework in which we can address the felt aspects of conscious representation. IMHO, the major problem to be solved is that we do not yet have a specific methodology able to characterize with any degree of objectivity and precision which sensations are actually felt.

Suppose I wish to refer to a specific red hue, say the red of a flower petal, in my visual field. The problem, I would argue, is that there is no way to verify whether we have the same felt experience of the flower petal. Indeed, pointing to a specific portion of the petal is of no help because, given the contingencies of perceptual experience (slight differences in light reflection, spatial position, and even biological makeup of the perceiver), it very highly likely that the felt aspect of our conscious
representation of the flower petal should vary ever so slightly. Even if we look at the same petal, we cannot verify that we have the same qualitative representation.

In other words, when I refer to an objective stimulus, there is no problem of reference because the same object is available in all our overlapping experiences (i.e., we both see a flower petal). Most scientific theorizing is made from just this point of view: we use our representations to refer to the world. The problem, however, begins when we attempt to speak of our “representations” per se, which cannot overlap in the same way. We still have no systematic way of verifying whether we are feeling the same shade of red, hearing the same pitch, etc.

How does one refer to qualitative aspects of conscious experiences? Can one actually refer to qualia? Perhaps this is the key to solving the “hard” problem? I have begun to think that perhaps the way out of this impasse is to study subjects with obviously different felt experiences of the same object; for instance, it is conceivable that comparative studies of patients with tr- and dichromatic vision could be of some help, or again of normal subjects and others with blindsight.

Arnold Trehub 15 July 2012 08:52
The hard problem is turned into an insoluble problem by the mistaken notion that feeling must be something that is “added” to an essential brain process -- the activity of a particular kind of brain mechanism. So the objection is repeated: “But the “doing” of the brain mechanism does not explain its “feeling”!” If we adopt a monistic stance, then the processes -- the doings -- of the conscious biophysical brain must “constitute” feelings, and nothing has to be added to these essential brain processes.

I have argued that we are conscious only if we have an experience of “something somewhere” in perspectival relation to our self. The minimal state of consciousness/feeling is a sense of being at the center of a volumetric surround. This is our minimal phenomenal world that can be “filled up” by all kinds of other feelings. These consist of our perceptions and other cognitive content such as your emotional reaction to reading this comment.

On the basis of this view of consciousness, I proposed the following working definition of consciousness:

“Consciousness is a transparent brain representation of the world from a privileged egocentric perspective.”

The scientific problem then is to specify a system of brain mechanisms that can realize this kind of egocentric representation. It is clear that it must be some kind of global workspace, but a global workspace, as such, is not conscious -- think of a Google server center. What is needed is “subjectivity,” a fixed locus of spatiotemporal perspectival origin within a surrounding plenum. I call this the “core self” within a person’s phenomenal world. A brain mechanism that can satisfy this constraint would satisfy the minimal condition for being conscious. I have argued that the neuronal structure and dynamics of a detailed theoretical brain model that I named the “retinoid system” can do the job, and I have presented a large body of clinical and psychophysical evidence that lends credence to the retinoid model of consciousness.

Maxwell J. Ramstead 16 July 2012 09:20
I agree wholeheartedly with you: I too think that the “doing”--“feeling” dichotomy is a false one, in that necessarily, from a monistic point of view—and we’re all monists here, aren’t we?—feeling must necessarily be something the nervous system does, and hence feeling is a kind of doing. I would even go so far as to say, following the late F. J. Varela, that “living is sense-making.” Up to here we’re in agreement.

However, I disagree that feeling can be reduced to a privileged egocentric perspective. IMHO, such a position conflates subjectivity for phenomenality. Correct me if I’m wrong, Doctor Trehub, but you seem to be implying that if we cannot determine the mechanism responsible for integrating information into a first-person perspective, using for instance a global workspace architecture, then the problem of phenomenal experience itself dissolves. Once we have specified the processes that generate a minimal ego-space, all we would need to do is populate the latter with phenomenal objects.

I would argue that things are not so simple. Indeed, while models like Baars’ and Merker’s do an excellent job explaining this first-person vantage point, they do not yield felt qualities per se, at least not in an explicit way. Consider Merker’s example of the vehicle equipped with a camera and imaging software. The vehicle in question is able to generate a kind of minimal ego-space; yet, I would venture that it does not yet feel any of the things that populate its phenomenal world. Indeed, the claim that all I need to do is “fill up,” as it were, my egocentric perspective with objects (such as my perception of the text on this screen, or my feeling of great interest upon reading your comments) seems, at least to me, to be yet another spin on the “extra ingredient” solution. The only difference is that the extra ingredients you are proposing get their phenomenality from an equally mysterious property of the ego-space, which is to generate feeling, for some unexplained reason.

I am extremely sympathetic to ego-space oriented views of phenomenal experience, but they do not explain away phenomenality. IMHO.

Arnold Trehub 16 July 2012 10:34
Indeed, while models like Baars’ and Merker’s do an excellent job explaining this first-person vantage point, they do not yield felt qualities per se, at least not in an explicit way.

I must say that Baar’s and Merker’s models do NOT “explain” the first-person vantage point. They “posit” a first-person vantage point, but they do not specify the neuronal structure and dynamics of a brain mechanism that can realize a first-person vantage point. Also, a vehicle equipped with a camera and imaging software does NOT generate a minimal ego-space because it has no internal analog representation of the volumetric space in which it exists. To my knowledge, my detailed model of the “retinoid system” is presently the only model that “explains” subjectivity/1st-person perspective. Moreover, the SMTT experiments that I cited actually demonstrate that a vivid conscious experience, without a matching stimulus, can be systematically generated and shaped by the properties of the brain’s putative retinoid mechanism.

What do you think has to be added to the biological structure and dynamics of the retinoid system to give us our phenomenal world?

Maxwell J. Ramstead 16 July 2012 11:04
Thank you for getting back to me so fast, Doctor Trehub! I will refrain from further speculation until I have examined your model, which looks quite interesting indeed. I have downloaded a copy of chapter 16, and I will get back to you.

Can you suggest any more material? I’d be glad to take a look.

Arnold Trehub 16 July 2012 11:38
Glad to oblige. Here are three recent publications that you might look at:

http://people.umass.edu/trehub/YCCO828%20Copy.pdf
http://theassc.org/documents/where_am_i_redux
http://evans-experientialism.freewebspace.com/trehub01.htm

Arnold Trehub 17 July 2012 08:45
Hi Bernie,

You wrote: “I argue that observing ego functions are coextensive with contextual frames for qualitative experiences...”

This has puzzled me for a long time. I think of the “ego” as the core self (I!), a cluster of neurons that constitute the perspectival locus of spatio-temporal origin within our phenomenal space (retinoid space in my theoretical model of consciousness). It seems to me that the long-held notion of the ego/self as an “observer” has been a serious stumbling block in our understanding of consciousness. In detailing the plausible neuronal mechanisms that might generate our conscious content, I found that the ego/core self could not have the biological machinery needed to be an observer and, at the same time, function as the fixed perspectival origin of all conscious experience. The only way that my theoretical model of the cognitive brain could work effectively was to have observing mechanisms in the synaptic matrices among all the pre-conscious sensory modalities. So “observation” could not be an ego function. The role of the retinoid system is to “bind” the various pre-conscious sensory observations/features (as patterns of recurrent axonal projection) in proper spatio-temporal register within retinoid space, our phenomenal world. In this process, selective excursions of excitation over retinoid space that are induced by the core self/ego (heuristic self/loci) play a critical role. But this does not entail an observing ego. For more about this, see:

http://people.umass.edu/trehub/thecognitivebrain/chapter7.pdf

This way of thinking about the self/ego in relation to observation has enabled the explanation of many previously inexplicable conscious phenomena and the successful prediction of new experimental findings. I would be greatly interested in your thoughts about this formulation of “observation” in the retinoid theory of consciousness, Bernie.

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**Stevan Harnad** 22 July 2012 09:21
HARD PROBLEMS NEED SUBSTANTIVE SOLUTIONS (Reply to multiple commentaries)

The “hard” problem is not a metaphysical one, and declaring oneself to be a card-carrying monist does not solve it. Nor does “operationalizing” the measurement of feeling. (That’s the others-minds problem, and the Turing Test – T2, T3 or T4 – is the best we’ll ever get.)

Nor does one’s monist-card do away with the doing/feeling dichotomy: Yes, the brain must cause feeling, somehow, for some adaptive or functional reason. And causing is doing. But the trouble is that we do not know how, and we do not know for what adaptive or functional reason. And explaining that is the hard problem. It cannot be hand-waved away by blurring distinctions or invoking monism or telling Just-So stories...

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**Arnold Trehub** 22 July 2012 11:41

"Some stories help us explain/understand consciousness/feeling. Other stories obfuscate our understanding of consciousness/feeling."

Stevan, what is the difference between a "Just-So story" and a scientific theory?

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**Stevan Harnad** 22 July 2012 14:40
CORRELATION VS CAUSATION

A scientific theory gives a testable causal explanation of the evidence.

A Just-So Story just gives a causal interpretation (hermeneutics), viz:

"Why do plants grow toward the sun?" Because of a phototropic force.

"Why do organisms feel?" Because of activity in this neural system...

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**Arnold Trehub** 23 July 2012 08:17
THE RETINOID THEORY IS A CAUSAL EXPLANATION OF HOW AND WHY WE FEEL (have conscious experience)

Stevan: "A scientific theory gives a testable causal explanation of the evidence."

Consider the following:

1. I am conscious if and only if I have a "sense of being here with something all around me even though the particulars are constantly changing". Call this the minimal conscious content (MCC).

2. MCC must be the product of an active brain. Given this stipulation, I have proposed, as a working definition, that consciousness (MCC) is a transparent brain representation of the world (the space that is all around me) from a privileged egocentric perspective (me here).

HOW:

1. What system of mechanisms in the brain has the competence to cause MCC? I have proposed that the human brain has a system of neuronal brain mechanisms with the structure and dynamics that can represent a global volumetric spatiotopic analog of the world space we live in, including a fixed locus of perspectival origin that I call the "core self" (I!). This part of the retinoid system is called RETINOID SPACE. I have specified the minimal structure and dynamics of the brain system that regulates the content of retinoid space and call it the RETINOID SYSTEM.

2. Why should we think that the retinoid system is a competent causal model of MCC? It seems clear that any competent model should be able to make relevant predictions that can be tested and are empirically validated. One thing we should NOT expect is that a competent causal model must be able to exhibit ALL the properties of MCC. (Think this unwanted expectation plays a part in the “explanatory gap” notion in consciousness studies.) What we should expect is that the candidate model of MCC be able to generate matching analogs of relevant properties of the phenomena.

3. In a wide range of empirical tests, the operating characteristics of the retinoid model successfully predicted/explained previously inexplicable conscious phenomena/feelings, and also successfully predicted novel conscious phenomena. Among many examples are hemi-spatial neglect, seeing-more-than-is-there (SMT), Julesz random-dot stereograms, the pendulum illusion, 3D experience from 2D perspective drawings, the moon illusion, the Puffinich effect, etc.

Why:

Organisms without consciousness/feeling do not have an internal global representation of objects and events in the world they live in, and can only respond to the immediate exigencies of their environment with reflexive adaptation. Conscious creatures, on the other hand, do have internal representations of the world they live in and gain an evolutionary advantage by being cognizant of the objects and events in the world with affordances for their survival and flourishing. In humans,
To address Dr. Treehub's points at their fundamental level, he believes we form perspectival and subjectively-unique representations of the world and ourselves in a

In any case, the empirical support does not seem to be addressed in the above exchange, and Dr. Harnad dismisses the model on a merely conceptual basis. Support of his theory of retinoid space, but the conceptual framework he has described does attempt to address how feeling is generated and represented in the brain.

I must say that I identify with Dr. Treehub's sentiments here. I admit that I have not critically evaluated the all of the empirical evidence Dr. Treehub has cited in his 23 July post. You should note that all of this is not mere speculation as there is a very large body of empirical findings that support the retinoid theory of consciousness/feeling. The bottom line is that the retinoid system CANNOT DO WHAT IT DOES UNFEELINGLY! The neuronal structure and dynamics of retinoid space provides an innate brain mechanism that constitutes *subjectivity*, which is the fundament of all feeling/consciousness. So, autaptic-cell activity in retinoid space causes feeling and nothing additional has to be accounted for as a generator of feeling. The WHY question is also answered in the neuronal activity that constitutes the subjective phenomenal world. The neuronal activity that constitutes the subjective phenomenal world is the neuronal activity that constitutes the retinoid space.

As an aside, I want to express my thanks to you, Stevan, for providing this sky-writing platform where we can actively engage in detailed discussion about consciousness, the most significant and vexing problem in science. This is the kind of back-and-forth that is needed.

Arnold Trehub 2 August 2012 07:50

Stevan: “One cannot just posit that a neural system feels, and then ask for counter-arguments. One has to explain how and why it feels, rather than just does whatever it does, unfeelingly.”

I did explain how and why one feels in my post above of 23 July 2012. Apparently you are still puzzled. Let me approach the problem from a different angle. If we are to explain how and why we feel, we must offer an overt description of what it is like to have any kind of feeling.

**WHAT IS IT LIKE TO BE? IT IS TO FEEL LIKE YOU EXIST IN A SURROUNDING SPACE.**

This is your primitive phenomenal world. But with no sensory transducers to detect the space around you, how can you feel that you are in a space? This is the astonishing aspect of feeling that is the key to understanding how and why we feel. The neuronal structure and dynamics of retinoid space provides an innate brain representation of the space we live in, and it is organized around a fixed locus of spatio-temporal perspectival origin which is our self-locus -- our core self! This special kind of neuronal brain mechanism constitutes *subjectivity*, which is the fundament of all feeling/consciousness. So autaptic-cell activity in retinoid space causes feeling and nothing additional has to be accounted for as a generator of feeling. The why question is also answered in my 23 July post. You should note that all of this is not mere speculation as there is a very large body of empirical findings that support the retinoid theory of subjectivity/consciousness/feeling.

Stevan, if you still believe that some additional kind of brain activity is needed to account for subjectivity/feeling, then please tell us what you think it is and how its properties might be empirically tested.

Arnold Trehub 3 August 2012 07:56

Stevan: “What you are describing is a system that can behave adaptively in space. It needs sensors to detect, information processing, some dynamics, and effectors to respond. Even today’s simple robots do some of that.”

You have missed the most relevant aspect of the retinoid model. Retinoid space is a volumetric analog of the space that exists around you, and it includes a fixed locus of perspectival spatio-topic origin -- the self-locus (I!) in the retinoid theory of consciousness/feeling. Also, retinoid space does NOT need sensors to give you a sense of being "here" in a surround. Sensory projections add phenomenal content/feelings to the subjective primitive of feeling as the origin of all experience. I should add that there is no known artifact, robot or computer, that contains an analog representation of the volumetric space in which it exists containing a representation of any of its parts.

Before we close our exchanges, Stevan, would you tell us what kind of scientific theory and evidence would, in your opinion, count as an explanation of how and why we feel.

Roberto Gulli 12 August 2012 11:53

I must say that I identify with Dr. Treehub’s sentiments here. I admit that I have not critically evaluated the all of the empirical evidence Dr. Treehub has cited in support of his theory of retinoid space, but the conceptual framework he has described does attempt to address how feeling is generated and represented in the brain. In any case, the empirical support does not seem to be addressed in the above exchange, and Dr. Harnad dismisses the model on a merely conceptual basis ("Why do internal representations have to be felt, rather than just representing?").

To address Dr. Treehub’s points at their fundamental level, he believes we form perspectival and subjectively-unique representations of the world and ourselves in a
network of neurons that he calls "retinoid space": this is the basis of subjectivity of feeling. (Whether this is a single locus or a distributed network of neurons is conceptually irrelevant, though this would need to be addressed in a complete explanation of how we feel.)

This type of subjectively-contextual neuronal network can operate independently or in concert with other brain systems (e.g., the motor control of respiratory muscles can occur independent of the retinoid space during autonomous breathing, or bound to the activity of neurons which compose the retinoid space). The binding of the retinoid space (or whatever you'd like to call the neuronal basis of subjective feeling) with myriad brain functions (other doings) could occur through mechanisms described by the global workspace theory of Dr. Baars, and/or the supramodular interaction theory of Dr. Morsella, etc.

Before dismissing this by asking why we need subjective feeling in such a system as described above, rather than just autonomous doing, I'd appreciate your opinion on this: could such a system exist without producing feeling out of these doings?

Stevan Harnad 12 August 2012 13:26
THE HERMENEUTIC HALL OF MIRRORS

@Roberto, what I am rejecting on a "merely" conceptual basis, you are accepting on a merely conceptual basis!

And in doing so I am afraid you are missing the point, which is certainly a conceptual one:

"Perspectival representations" are fine; you can have them in a robot (even "volumetric" ones, pace @Arnold!). But why should a representation be felt just because it's perspectival or volumetric?

I know it's discouraging to have every hopeful starter rejected, but the problem is not called "hard" for nothing. You can bet that if there is a solution, it's not going to be an easy (and question-begging) one like "perspectival representations."

What makes simple solutions look like they work is almost always hermeneutics -- which means interpreting something in terms of something else:

We know what it feels like to feel. Feeling is perspectival. Feelers have a "point of view."

(Add a few redundant mentalistic adjectives: a subjective, 1st-person point of view. For good measure, call it a "conscious experience", of which you are "aware."

Add that it is "aspectual" and has a "phenomenal character": an incarnation of "qualia" sometimes helps too.)

And when you've done all that, add that you have a perspectival model -- and presto, you have a solution to the hard problem.

The naive little niggle that always gets forgotten, though, is:

"Yes, I can interpret your model's properties as if they were felt properties, but you forgot to tell me how and why they were felt: Because otherwise they are simply encoded properties, and enacted properties, as in a robot (in other words, doings). They may have all the objective features you attribute to them -- doings, all -- but how and why are they felt?"

Mentalistic hermeneutics creates a hall of mirrors in which you read off exactly what you have projected into it, forgetting that the source is you.

(And in doing so I am afraid you are missing the point, which is certainly a conceptual one:

(By the way, Arnold Trehub's "perspectival/volumetric" hermeneutics are very similar to Bjorn Merker's "ego-centre" hermeneutics. And with his "global workspace," Bernie Baars is -- to pinch a quip from Bradley on metaphysics -- "a brother hermeneutician with a rival interpretation". Ditto for Shimon Edelman's "temporal integration" hermeneutics and Antonio Damasio's homeostatic hermeneutics, and for that matter, it would be true of Dan Dennett's "heterophenomenology" too, right down to the last JND -- if it weren't for the fact that Dan is actually denying the existence of feelings altogether, as not being anything but the doings of heterophenomenology...)

Roberto Gulli 12 August 2012 17:55

With all due respect, you've moved too quickly in saying I accept the proposal on a conceptual basis. However, over the past 1-2 months, I have formed at least a preliminary idea of what I believe the answer to the hard problem will look like, and I think that proposals such as those summarized by you above will be integral components, individually necessary but insufficient. Dr. Treehub's proposal appears consistent with some part of what I currently believe to be a plausible explanation of consciousness, and warrants further discussion and critique. However, I do not yet accept Dr. Treehub's proposal, since I have not yet had time to appropriately evaluate and critique it.

I don't believe the hard problem of feeling will be "solved" by a concise reductionist solution (a singular physical, yet undiscovered NCC), nor will it be answered at all if we don't rely the concept of feeling from something that is unavailingly subjective and distinct from doing (and thus inaccessible to scientific observation and experimentation). For these purposes, we should turn to hermeneutic proposals which explain feeling not in the subjective sense, but explain feeling by the mechanisms which contribute to its production -- explain feeling in terms of doing since doing causes feelings (causes - not correlates with) feeling. I'll expound on this in our discussion thread on your talk, as I think these two issues at this point coalesce...

Arnold Trehub 13 August 2012 08:53

Stevan: "Perspectival representations"are fine; you can have them in a robot (even 'volumetric' ones, pace @Arnold!)."

This is an important question of fact, Stevan. Please give us one example of an existing robot that contains an analog representation of the volumetric space in which it exists and has a representation of itself as the locus of perspectival origin within this volumetric space.

Robert: "— explain feeling in terms of doing since doing causes feelings (causes - not correlates with) feeling."

Yes, indeed! Stevan makes an incoherent claim when he allows that particular kinds of brain doings must cause feelings (conscious content), but that brain doings cannot explain how brain doings are felt. It is his strong intuition that there is no kind of brain activity that IS feeling. My strong intuition is that feeling must BE a particular kind of brain activity. I have specified the kind of brain activity that is necessary and sufficient to constitute feeling (activation of retinoid space), and I have presented empirical evidence in support of the retinoid model of consciousness. Stevan apparently believes that his intuition trumps empirical evidence.

Arnold Trehub 14 August 2012 08:41
Stevan: "Mentalistic hermeneutics creates a hall of mirrors in which you read off exactly what you have projected into it, forgetting that the source is you."

Isn't this true of all human judgement? Surely you don't exempt yourself from this human dilemma. Science does a reasonably good job of compensating for our personal idiosyncrasies by demanding empirical evidence to support our personal guesses about how the world works. What empirical evidence supports your guess that human feelings are not the doings of a human brain?
There are many reports of mentation during slow-wave sleep. Another PubMed search will turn those up. SWS mentation is said to be much less fantastical than REM sleep. However, did you mean this only in a superficial and literal sense, or actually that *thoughts* might actively appear in the mind of a person sleeping? I have heard that Night Terrors typically occur during Stage 4 rather than REM sleep, typically associated with dreaming.

Firstly, I was very interested by the idea that the cortex is "awake" during slow wave sleep at the peak of the delta wave. This is intuitively acceptable because of the nature of an EEG. However, did you mean this only in a superficial and literal sense, or actually that "thoughts" might actively appear in the mind of a person sleeping? I have heard that Night Terrors typically occur during Stage 4 rather than REM sleep, typically associated with dreaming.

In a similar vein, your proposal that consciousness is not localized to one area, as has been found with the cases of attention/working memory, is also intriguing because a devoted structure for consciousness seems unlikely. This, I say because, just as sensory memory is at least partially found in the neuronal connections of the relevant systems and I think it would be extremely difficult to build a working retinoid system with current technology. To get an idea of what would be involved, see http://people.umass.edu/trehub/thecognitivebrain/chapter4.pdf and OBJECT RELATIONS, here: http://people.umass.edu/trehub/thecognitivebrain/chapter7.pdf

Morgan Smith 4 July 2012 18:56

Firstly, I was very interested by the idea that the cortex is "awake" during slow wave sleep at the peak of the delta wave. This is intuitively acceptable because of the nature of an EEG. However, did you mean this only in a superficial and literal sense, or actually that "thoughts" might actively appear in the mind of a person sleeping? I have heard that Night Terrors typically occur during Stage 4 rather than REM sleep, typically associated with dreaming.

In a similar vein, your proposal that consciousness is not localized to one area, as has been found with the cases of attention/working memory, is also intriguing because a devoted structure for consciousness seems unlikely. This, I say because, just as sensory memory is at least partially found in the neuronal connections of the relevant association areas, it is again likely (on a common-sense level only) that the sort of multimodal integration and selection cannot be limited to any one structure in the brain (except the thalamus!). The question I see here is: is the observed cortical gamma-wave synchrony present in conscious action consciousness itself (i.e. GWT) or the "steam whistle"?

Bernard J Baars 12 July 2012 12:58

This is a very hot research area, and I would strongly recommend searching PubMed.gov for the latest and greatest findings. I'm not interested in making claims (where I can't run the experiments myself) but only in reporting what others have found. Check out Massimini and Tononi, and recently Rosanova, Laureys, and Massimini and Tononi. There are others.

There are many reports of mentation during slow-wave sleep. Another PubMed search will turn those up. SWS mentation is said to be much less fantastical than...
classical dreams.

My 1988 book, last chapter, suggests six "necessary conditions" for consciousness, which are not reducible to ONLY GWT, or ONLY gamma, or whatever. Since 1988 we've picked up some more brain conditions. Please see the two textbooks by Baars & Gage, or other solid sources.

Remember, this is the Himalayas of empirical questions. You have to do a lot of walking before it all becomes clear...

Roberto Gulli 4 July 2012 19:26
I very much agree with the aspects of global workspace dynamics which allow for multiple loci/types of consciousness we all possess (and much stressed by Dr. Harvey).

The example of HM mentioned is particularly illustrative of exactly why this type of system may be plausible, and the advantage of having a distributed but integrated neural network underlying these many forms of consciousness.

It was rightly pointed out that HM was still conscious, despite the rather drastic bilateral MTL transection. However, in the decades intervening his surgeries and death, he was unable to hold any experience in his consciousness (in this case, long-term memory) once the moment in question had passed. He was fully functioning and conscious with respect to the moment he was in, or the decades prior to his operations. He could even learn new motor skills, or recall the simple number sequence (5-8-4) until his attention was shifted; but still, the aspects of his consciousness afforded by the MTL were irrevocably lost.

Bernard J Baars 12 July 2012 13:05
Yes, it's chicken and egg, because we don't know the intermediate forms in evolution. Over 200 million years of mammalian evolution we just have some spotty leftovers. It is also likely that evolutionary changes are commonly punctuated, when entire stretches of DNA move or are, or are even "borrowed" from viruses or symbions (like the mitochondria). In recent human evolution the "funnel beaker culture" of north west Europe is thought to have changes substantially over a short period of time by means of jumpy evolution.

There's a lot of thinking that consciousness predates the mammalian cortico-thalamic system, and that there are important parallels in birds and cephalopods. Precisely how that could be is beginning to be a hot topic.

This is fun stuff.

Carey YL Huh 6 July 2012 16:36
The theory presented by Dr. Baars that different brain regions could participate in consciousness (in the loose sense of the word) by contributing different conscious contents is very appealing.

Since some of these regions are more developed in humans/primates compared to other mammals (PFC for example) and presumably they contribute different conscious contents compared to evolutionarily older structures, I wonder which was first - the need to have these contents in our consciousness or the rapid growth of the appropriate structures with evolution (I know it's kind of chicken-or-egg question!).

Bernard J Baars 12 July 2012 13:05
Right. I think you probably did not mean "he was unable to hold any experience in his consciousness (in this case, long-term memory)." Stored information in LTM is not conscious. We need to retrieve it in order for it to become conscious.

Pier-Éric Chamberland 9 July 2012 10:07
Is it possible to have the download link to the mp4 file instead of the youtube link, please? Thank you

Bernard J Baars 12 July 2012 13:06
I don't know how to do it, but I'm always looking for IT-savvy helpers!

Alexandre Duval 21 July 2012 15:12
Dr. Baars makes a powerful empirical case for GWT. But I just want to raise one tiny philosophical issue: there is a huge debate among materialist philosophers as to whether we should try to give a reductive explanation of phenomenal consciousness at the intentional/cognitive level or at the neurobiological level. (In a nutshell: people who choose the first option believe that all that is required for a creature to have conscious states is some kind of information-processing system that functions in some specific way (regardless of how it is implemented physically). People who choose the second option will say that for a creature to have conscious states certain physical events that can be described at the neurobiological level (e.g. neurons oscillating at some specific frequency) must occur in its brain.) His talk did not address this issue directly and he did not mention the notion of NCC. So it is not clear to me which of those two views he favors. His 1988 book includes the term 'cognitive' in its title, so it seems to suggest the first option. But I have also noticed that in their 2011 paper Lau and Rosenthal keep referring to GWT as 'neuronal GWT'. So which option does he favor?

Marjorie Morin 25 July 2012 12:17
Originally posted on facebook
ERIC MUSZYNSKI:
Sossin: "[Aplysia have] no need for firing in the absence of inputs" - could this be a clue to our self-awareness? Our neurons are supercharged and MUST discharge even in the absence of stimulus or motor control, so it accidentally turned into self-awareness... It would then be just a spandrel of our powerful brain? No function needed to explain it.

Marjorie Morin:
It's a very interesting point. He said that consciousness may require a certain minimal brain size. If we follow your logic it might not be the size of the brain as much as how much it is "occupied" by what it has to process that could bring consciousness?
Xavier Déry  31 July 2012 11:23
Baars talk: the theatre analogy for relating consciousness to general brain works seems to me very elegant and really useful!

Matthew Leavitt  10 August 2012 18:10
I feel like Dr. Baars staged a concept at the beginning of his talk that wasn’t explicitly integrated with the rest of his presentation. Specifically, he discussed evolutionary pressures regarding the limited capacity and compensatory value of consciousness. While the subsequent content (biology of global workspace theory) is clearly related to his introduction, I don’t think it was ever contextualized evolutionarily nor was the compensatory value made explicit. It seems as though this first section was more related to the earlier title of his talk.

There are a few benefits of a “global workspace”-style consciousness that occur to me. For one, it provides a powerful ability to integrate disparate sources of information. It seems this would facilitate rapid and flexible learning and generation of myriad behavioral contingencies. The modularity also affords robust functioning in the face of brain injury (though one could argue that this is a general property of the brain, not the global workspace specifically).

Are my conclusions valid? Would Dr. Baars or other interested parties care to answer the issues I feel were unaddressed?

I should mention that I am nitpicking, and I found the talk quite fascinating.

Ezequiel Morsella  : The Primary Function of Consciousness in the Brain

Abstract: Despite the challenges in unraveling how the nervous system gives rise to consciousness, a consensus has been growing that (a) consciousness is associated with only a subset of all nervous regions and processes, and (b) the primary function of consciousness is to integrate processes/information that would otherwise be independent (the integration consensus). Recent research illuminates the subset of areas and processes that are most closely related to conscious processing. These investigations reveal that consciousness serves to integrate only certain kinds of information/processes. Many forms of integration can occur unconsciously. The peculiar form of integration associated with consciousness involves a form of information broadcasting that is intimately related to what is casually referred to as ‘voluntary’ action and to the skeletal muscle output system. All these developments are synthesized in Supramodular Interaction Theory (SIT). During this lecture, I will review evidence for the integration consensus, SIT, and other notable contemporary reductionistic approaches.


Comments invited

44 comments:

Marjorie Morin  4 July 2012 06:45
I find Morsella's theory very interesting concerning actions/senses etc. But how can this conflict and integration theory be applied to our consciousness of "internal states" like beliefs, understanding, ideas, etc?

Shady Rahayel  4 July 2012 06:56
The example E. Morsella just proposed, someone's urge taking its origin from the unconscious sight of a burden cigarette moments prior to the urge, is responding to your question. I imagine that two thalamocortical loops controlling for two semi-independent certain unconscious processes would just become aware to the individual once these get into conflict, just like it would be in a Stroop task. It seems to be a bit synthetic, but with a little of effort I can imagine it.

Frédéric Banville  4 July 2012 06:57
My first reaction would be to point out that these things are all related to language. Well, I'm not clear on whether understanding (depending on one understands it...) is a matter of language, but things like ideas, beliefs and so on are, I think strongly related to the human faculty of language. What Morsella describes is a very basic kind of consciousness, one that certainly does not require linguistic capabilities. So now, there's two options: either you try to see how language can be superimposed on top of that basic consciousness and how it modifies or extends it, or you argue that conscious states must include these "internal" states.

Shady Rahayel  4 July 2012 07:07
Read in Baars "The biological cost of consciousness" (2012): What about the fact that conscious waking happened hundreds of millions of years ago, way before the appearance of language (only 100,000 years ago)? Would that mean that prior to the development of language, beings weren't capable of understanding? I don't think so.

Laurie-Anne Dion  4 July 2012 07:11
I thought you made a very good point Marjorie. My first thought was: If we are conscious when two processes are in conflict, maybe it works as well for internal states. (If you look at your mind as a pool of thoughts/ideas... all in conflict to reach consciousness)

Laurie-Anne Dion

Frédéric Banville  4 July 2012 07:15
After all, on the face of it, integration is just integration! because conscious integrations are faster or stronger is not yet to explain how and why the fact that they are conscious makes them faster or stronger. But why should those special integrations be conscious (felt) -- rather than just integrations? To say that they are conscious integrations rather than just integrations perhaps the things that are conscious involve certain special kinds of integration that the unconscious things do not.

There's no question that there are some things of which we are conscious, others not; some things we do (or can do) consciously, others not. Integration and integration

Stevan Harnad  4 July 2012 06:47
Integration and Integration

There's no question that there are some things of which we are conscious, others not; some things we do (or can do) consciously, others not. Perhaps the things that are conscious involve certain special kinds of integration that the unconscious things do not.

But why should those special integrations be conscious (felt) -- rather than just integrations? To say that they are conscious integrations rather than just integrations because conscious integrations are faster or stronger is not yet to explain how and why the fact that they are conscious makes them faster or stronger.

After all, on the face of it, integration is just integration!

Claudia Polevoy  4 July 2012 07:44
I don't think that Morsella's theory only pointed out faster/stronger integrations but more importantly widespread networks involving different brain regions and loops. He suggests that one of the these region might be the frontal cortex (one hypothesis among many others because we don't know the exact cerebral region of consciousness). Maybe this is why and how we can understand non-automatic action/behavior/reaction, etc since the frontal lobe is known to be associated with more higher functions, for example the capacity to understand consequences of an action, introspection, social behaviors, emotion-related memories, etc. For my point of view, consciousness is a mental function just as executive functions or memory are, and that only some species have developed it through evolution based on adaptive needs (human, non human primates, maybe not aplysia !) ... but this come from an experimental neuropsychology student !

Ezequiel Morsella  6 July 2012 13:36
Dear Prof. Harnad, this is an excellent point. The approach simply identifies integrations that reliably occur consciously and integrations that can occur unconsciously, with no claims about conscious integration being stronger or faster than its unconscious counterpart, as commented above by Ms. Claudia Polevoy . The approach is "descriptive," simply pointing out, among other things, the integrations that can occur unconsciously. Conscious integrations seem to be associated with, not "afference binding" (e.g., intra- and inter-sensory binding) or "effference binding" (i.e., stimulus-response binding), but "integrated behavior" through "effference-effference binding," which is peculiar to the skeletal muscle output system. Yours is an excellent point: Why subjectivity is part of this process remains a mystery from this standpoint, unfortunately.

Ezequiel Morsella  6 July 2012 13:59
Regarding neural processing, one of the main points of the talk was that there is no consensus regarding the neuroanatomical correlates of consciousness, unfortunately. There is strong evidence for each of the many contemporary neuroanatomical hypotheses. "Your comment about frontal cortex is an excellent point to keep in mind.

Roxane Campeau  12 July 2012 13:00
And back to the question WHY (which is constantly and pertinently pointed out by Pr. Hamad), even a consensus regarding the neuroanatomical correlates of consciousness wouldn't solve it. Even if substrats are not causes, "we will never have access at the origins, so we can only focus on characterizing conditions that allowed language[consciousness/feelings], without absolute causality or determinism" [this sentence is from Rastier, 2006, "De l'origine du langage à l'émergence..."].
du milieu sémiotique* où il était en train de parler de la pertinence de travailler sur les origines du langage).

Maxwell J. Ramstead 14 July 2012 11:19
IMHO, what is bothering about the problem of how consciousness emerges from information integration is less the problem of subjectivity—i.e., theories like Baars’ and especially Merker’s—could account for the subjective aspect of experience—but rather the problem of determining why any of the integrated information generates a phenomenal experience. Indeed, models like Merker’s give us mathematical explanations for why experience should be construed as centered on a subjective, first-person vantage point. This has to do with information integration, and it is arguably an “easy” problem: how should one generate, from the data available to our sense organs, a 1st-person vantage point?

The challenge Doctor Harnad is proposing is to determine at what point, in the integration of information flows, something like felt experience begins to emerge. If consciousness is a feature of certain types of information processing, then indeed such a point will be determinable, qua feature of information flow and integration. However, if consciousness is a more basic characteristic of biological systems, such an approach might be misleading…

Sebastien Tremblay 28 July 2012 16:43

Disagreements between scientists regarding “what is the location of consciousness” in the brain sounds to me like a like a man asking: “where is the Internet on earth?” Many different people can go in many different countries and report that “they have found Internet there, therefore, country X is the source of Internet.” This disagreement in localization originates from a misunderstanding of what consciousness, or Internet, is. Dr Morsella’s analogy to a global broadcasting system certainly helps resolving this issue.

Philippe Vincent-Lamarre 4 July 2012 06:53

What about cognitive conflicts? Slioman's dual process theory explain that there is two system: and A and B, called heuristic and analytic systems by Evans. These two systems differ by the way they work. For those who are familiar with this theory, could we make a comparison of the heuristic/analytic system and the smooth/skeletal muscle systems? The problem I can find about this is that to “experience” conflicts in the muscular system it has to be two skeletal muscle system that are in interaction and it can't be a smooth and skeletal muscle. Or there would be no conflict (maybe I misunderstood this part). But in the dual process theory, the heuristic system (wich would be the equivalent of smooth muscle system) and the analytic system are sometimes in conflict and the analytic have to override the heuristic system.

Guillaume Loignon 4 July 2012 06:54

My question: if consciousness is conflict resolution, how are the conflicts resolved? Doesn’t that imply some sort of higher-level structure that takes a decision (in a cartesian-theater kind of way)?

Shady Rahayel 4 July 2012 07:02

I wouldn't know for sure, but if you take the Stroop task where people are most likely to read the word written than to tell in what colour it's printed, the conflict might be resolved according to how previous experiences (your life experience) consolidated common sense: you’re most likely to need to read a word than to tell the colour. The reading module is probably stronger than the telling-the-colour one. Would that be high-level decision? I don’t know; the decision to read the word and not the colour is unconscious and out of our voluntary action. If we were really pushing our higher-level capacities unto the task, we wouldn't be sometimes mistaking ourselves in reading the words.

Emma Cusumano 4 July 2012 07:30

Right. Couldn’t (unconscious) attention modulate Stroop-like conflicts?

Less important but maybe interesting for Morsella's theory: Amir Raz showed that the hypnotic suggestion to experience the words of the Stroop Task as meaningless squiggles overrides the Stroop effect, i.e., eliminates the conflict. So here the experience of the words modulates whether or not conflict is perceived at all, which seems to decouple conflict resolution and consciousness.

Shady Rahayel 4 July 2012 07:35

The fact that hypnotic suggestions can resolve the conflict through diminished awareness to the words is very interesting!

Thank you!

Diego Mendoza-Halliday 4 July 2012 07:06

CONSCIOUSNESS AS A MEDIATOR OF CONFLICT: There is something in conflict that may be key to understanding the function of consciousness. There is conflict happening constantly in behavioural plans. Each subsystem of the brain is pushing to do something, but only one behavior comes out. Every time 2 or more planned behaviors are in conflict, there needs to be a resolution. If each of these systems wants to push out its own behavior and there is no universal rule to resolve conflicts, then each conflict becomes a separate battle of subsystems. There is where consciousness may have come into play as a mediator. It receives influences from all those subsystems at a time, and integrates these influences, giving each a particular weight, to come up with a unique and integrated behavioural output.

Alexandre B. Romano 4 July 2012 07:08

Je me demandais comment la théorie de Morsella s’applique aux animaux, notamment les animaux avec des systèmes nerveux très simples. En effet, si la conscience sert principalement à la résolution de conflits, il semblerait que tous les organismes qui ne font pas face à de tels conflits ne pourront être considérés comme conscients.

Frédéric Banville 4 July 2012 07:31

Si j’ai bien compris, son but est de trouver la forme la plus fondamentale de “conscience”. Sous cette interprétation, les organismes qui ne font pas face à de tels conflits ne sont pas conscients, parce qu’ils n’ont pas besoin de la conscience. Ce qui serait intéressant serait de regarder qu’est-ce qui fait qu’un organisme fait face à de tels conflits (par exemple, y a-t-il un type de problème adaptatif particulier à régler). Ça permettrait peut-être de s’approcher d’une explication écologique de l’émergence de la conscience. Enfin, peut-être.
also be the stage of sleep during which the skeletal muscles have the least (if at all...) activity? Then consider this: why is it that the only stage of sleep during which we have the impression of being conscious is REM sleep (where dreams occur), which happens to involve skeletal muscles.

Izabo Deschenes 4 July 2012 09:47
Does being aware of something make us feel? accessing certain information make us feel? paying attention to something bring it into consciousness? Can’t we feel what is like to be a human, or at least what it is like to be ourselves, without any outside input to pay attention to? Is ‘internal input’ or I guess thoughts just as salient/relevant in terms of consciousness as external input?

Izabo Deschenes 4 July 2012 16:23
I cannot think of a situation where there is no “outside input” to pay attention to, as long as we are in a body.

Nico Sheppard-Jones 31 July 2012 23:12
Martha: what about dreams?

Izabo Deschenes : I agree, the field of consciousness would greatly benefit from agreement on how to define the awareness/attention/consciousness/feeling. Although I disagree with Pr. Hamad when it comes to doing away with ‘weasel words’, I do think feeling=consciousness is a good place to start at. Awareness I would characterize as a passive state elicited and modulated by stimulus/input intensity. I would say that Attention is different from Awareness in that it is an active state that acts on what is available through awareness. Thoughts?

Shady Rahayel 4 July 2012 07:31
Mais je ne crois pas que E. Morsella ait dit que la conscience serve principalement à la résolution de conflits. Il a dit que dans le cas d’un “synchrony blindness”, on aurait seulement conscience que deux processus divergents aient eu cours au moment où ceux-ci rentrent en conflit l’un avec l’autre. Je ne crois pas qu’il ait nécessairement dit qu’un processus non conflictuel soit moins “conscient” qu’un qui implique un conflit.

Ce qui est intéressant, je trouve, avec le “synchrony blindness” est que même s’il y a différents processus survenant en même temps, donc couvrant une plus large région d’activation cérébrale, cela n’amène pas nécessairement une conscience des processus en cours.

So, is the consciousness that we are aware of during REM sleep related to the conflict or the action, or is it a separate state?}

Andreas Kalckert 4 July 2012 07:33
An issue i thought about this: at what point does the consciousness experience start. In the moment the conflict is detected, or when it is subsequently handled? I think he answered before that the post-conflict can be handled unconsciously again. However, then is it more than just drawing attention to the conflict? Is consciousness than equal to attention?

Izabo Deschenes 4 July 2012 09:47
I was also wondering that. Also, how exactly do we differentiate/relate/define the terms, aware/awareness, access and attention in relation to consciousness?

André Duval 4 July 2012 07:49
Je pense qu’il a dit assez clairement dans la période de questions que la présence de conflit relié aux “skeletal muscles” n’est pas à une condition nécessaire pour être conscient à un moment donné (cependant, elle est peut-être suffisante). On peut être conscient même lorsqu’on écoute une conférence par exemple, sans ressentir aucun conflit. Donc, de ce point de vue, si la présence de conflit n’est pas nécessaire, les animaux pourraient (en théorie) être conscients sans jamais avoir à résoudre de conflits.

Etienne Dumesnil 4 July 2012 08:00
From what I understand from Professor Morsella’s talk, the function of consciousness would be to resolve conflicts while integrating information from parallel processes involving skeletal muscles.

First, I must say I find this view particularly interesting. Then consider this: why is it that the only stage of sleep during which we have the impression of being conscious is REM sleep (where dreams occur), which happens to also be the stage of sleep during which the skeletal muscles have the least (if at all...) activity?

Adele Tufford 4 July 2012 21:15
Yea, interesting observation... along these lines, in REM one often looses the ability to ground your dream-self and dream-experiences into your physical body - we often see ourselves flying, see our minds hovering above our physical body - or have an inability to translate our dream-thoughts into bodily action. We need a constant stream of proprioceptive feedback to create accurate body-maps, so perhaps the lack of motor efferent/aferent activity during REM party explains why REM feels so qualitatively different from just a day-dream, say.

On the topic of atypical states (not that there’s anything really atypical about REM...), what about phantom-limb sensations? What about individuals paralyzed from the neck downwards?

Ezequiel Morsella 6 July 2012 13:46
This is an excellent point. I should first mention that the theory pertains only to normal waking behavior, which is already complicated enough at this stage of scientific understanding :) Yet, your astute observation leads one to consider that both Sechenov and William James believed that conscious thoughts are intimately related to action. (Sechenov proposed that conscious thoughts are inhibited actions, which is an intriguing notion.) With these ideas in mind, one has to remember that, during rapid eye movement (REM) sleep, while one is having conscious dream content all the muscles are in a state of “sleep paralysis,” except that is, for the eye muscles. (I should mention that I am not a sleep expert but that this is what I have learned during the years.) It has been documented that, when such paralysis fails, animals (e.g., cats) act out their dreams, which is of course potentially dangerous for them. Although the theoretical approach presented during my talk pertains only to normal waking behavior, these observations associated with sleep paralysis (and the lack thereof) reveal the intimate link between conscious thought and skeletonmotor action,
consistent with some of the ideas of James, Sechenov, and the approach I presented. Again, you raise an excellent point.

Pier-Éric Chamberland 4 July 2012 09:57
Drawing from literature on unconscious goal pursuit, I found that the fact that the conflict between an unconscious and a conscious action brings the unconscious action to awareness, contrasts with the efficiency observed in unconscious goal pursuit when the unconscious goal-oriented actions are conflicted with temptations or important goals. Less self-regulatory energy is exerted and less conflict is felt if the goal has become so automatic that it is unconscious, when confronted to other goals or temptations, to the point of the decision to keep on pursuing the unconscious goal, and not the others, is automatic, and un-noticed. Actually, I am not sure if one is unaware of the decision process or is on deliberated consciously but without much effort. I will have to review Morsella and Bargh’s articles or chapters to find my answers...

Bernard J Baars 4 July 2012 14:51
Ezequiel, how is this different from global workspace theory? - B

Ezequiel Morsella 6 July 2012 13:49
The framework presented during my talk builds on the pioneering Global Workspace Theory (GWT) only in a few ways, including specifying which integrations in the brain seem to require conscious states and which integrations appear to not require such states. The approach, based on introspective data and synthesized in Supramodular Interaction Theory, begins to illustrate why conflicts involving perceptual processing (e.g., McGurk and ventriloquist effects) and smooth muscle conflicts are seldom conscious, but why certain conflicts (e.g., holding one’s breath or Stroop conflict) reliably involve conscious processing. The approach also explains why skeletal muscle has been referred to as “voluntary” muscle. In short, as mentioned in my reply above, in which I mention James and Sechenov, consciousness constrains what has historically been referred to as “voluntary action.” This form of action is a property of the skeletal muscle system. Thus, the approach builds on the classic and groundbreaking GWT.

Pauline Claude 4 July 2012 16:53
As it has been pointed out a couple of times since the beginning of this summer school, despite some scepticism on a real adaptive function of consciousness, consciousness has to have an adaptive function, otherwise it wouldn’t have remained through evolution.

Ezequiel Morsella brought for the first time in this summer school the fundamental idea that any organism with conscious processes also have unconscious processes. And maybe the key component to explain why consciousness appeared and remained through evolution relies on the fact that we have contents that will be always processed by unconscious processes and will never reach the level of consciousness whereas others do. So what would be the adaptive function of separating data into conscious versus unconscious contents?

Yassine Benhajali 4 July 2012 22:16
in my point of view it’s all manner of learning. Here’s a brief explanation of what I mean by this statement:
every day our brain is computing and guiding unconsciously a lot of different tasks in the same time but we are not aware of them. the brain can perform an amazing multitasking and multimodal works unconsciously but consciously we can barely perform three task in the same time. What we are doing every day is constant learning or attempt to learn. what I mean by learning is recalling or transforming conscious processies to unconscious process.
the best example is a baby who attend to control his body to grasb an object. this baby is extremly feeling his body movement and tring different combination of body movements to achieve the goal. From this example we can see the importance of unconscious learning... but in our daily life we are not able to learn unconsciously... it’s the conflict that makes us to focus and to be aware of the situation and to learn.

Jules Pelletier 16 July 2012 16:26
Learning and integrating are probably the keystone of conscious behavior. However, you have to be careful with bodily analogies such as a baby struggling to grab hold of his body.
A common mistake is to think that babies actually build their motor skills out of nowhere. It looks a lot more like inhibiting neuronal motor commands and building the unrelenting neurological surges that go through the brain.

Think of the thoughts that go through your mind as you drift asleep: they go from anything to anywhere, surfing on unreliable causal and affective links, and they do not make much sense. If you come back to yourself without falling asleep, you’ll probably remember the last thing you thought about without being able remember neither the thought before that or which path lead you there.
All in all, consciousness has got to be part of a restrictive process, similar to focus or attention.

Stevan Harnad 6 July 2012 02:33
FROM Ezequiel Morsella :
Thank you all for the wonderful comments presented here, presented after my talk, and presented throughout the days of this singular symposium, which has been an incredible learning experience for me. Each of these comments provides substantial food for thought.

If there is one point to remember from my talk it would be that not all integrations in the brain require consciousness and that integrations that require consciousness seem to have certain properties. I explain this more thoroughly in my article in Psychological Review, available at the following link. http://bss.sfsu.edu/emorsella/publications.html

Thank you again for all the feedback.
Best regards,
Roy Baumeister: The Why, What and How of Consciousness

Roy Baumeister The Why, What and How of Consciousness
video

Abstract: Consciousness is a distinguishing trait of human experience, but does it cause behavior or serve other useful functions? Recent critiques, especially from studies of automatic processes and brain functions, have suggested that it is inefficient and ineffective for controlling action and unnecessary for perceiving the environment. This talk reviews experimental studies on how manipulations of conscious thought cause changes in behavior. It draws new conclusions about what conscious thought can and cannot do — and what it can do better than unconscious processes. It goes on to argue that the core functions of conscious thought are for relating to the social and cultural environment.

http://carlson.umn.edu/assets/166663.pdf


Comments invited

Posted by Stevan Harnad

51 comments:

Stevan Harnad 4 July 2012 07:18
FEELING EVOLVED FOR SOCIAL PURPOSES?

Weren't pinworms already feeling ouch long before our ancestors became social?

Marjorie Morin 4 July 2012 07:27
That's what I was wondering too! In his point of view no social animals have had the need to develop consciousness...

Marjorie Morin 4 July 2012 07:28
Oups "no non-social animals"

Andreas Kalckert 4 July 2012 07:29
That means every animal living in a group is prone to develop consciousness too. And does it mean the bigger that group, the more likely it is, the more rapid it has to develop?

Marjorie Morin 4 July 2012 07:52
Does this mean social insects should have develop consciousness too? They do need to communicate? Would the size of the group be of importance? That is a really good question what would interacting with more people than less contribute to the development of consciousness? You would probably learn more than only just with your kins for example.

Morgan Smith 4 July 2012 08:12
Brain size has been shown to correlate strongly with size of social group in primates. Perhaps Baumeister is mistakenly labelled some sort of information-capacity or processing function as consciousness. His lecture strongly supports the evolution of the mirror neurone system in humans, as well as the chronology of bipedalism and language/tool appearance. The question of consciousness rides here upon how we define it, in terms of the concepts such as thought, learning, and "feeling".

Félix Mongeon 4 July 2012 20:39
You say "Perhaps Baumeister is mistakenly labelled some sort of information-capacity or processing function as consciousness". I would say that he definitely did not talk at all about feeling. Instead, his argument was only about how human use higher-level cognitive processes to manipulate conscious thoughts. He showed that conscious thoughts are data that can be manipulated using all sorts of higher-level processes (e.g. through logical thinking, social communication, introspection, creation of meaning, etc.). However, he did not even encountered the problem of why we feel something when we use such higher-level processes, i.e. why did they became felt processes?
ROY BAUMEISTER’S REPLY:

To Harnad Cluster

Most theories about consciousness distinguish two kinds or levels. One is simply the presence of an experiencing agent. This much we have in common with most other animals. The other level is the more uniquely human one, and that includes self-awareness, abstraction, reasoning, and the like.

Thus, when we talk about the capacity to feel pain and such basic things, we are dealing with the more basic level, and yes, it is generally assumed that animals (and possibly even insects) have this. As to why it has to be felt, well, my thought is that pain cannot serve its valuable functions unless it is felt, but my talk did not go into this.

Human evolution presumably built on this basic capacity for phenomenal awareness. Intentional communication with language is a key to being human, and that seems to require consciousness. (For example, it is difficult if not impossible to carry on a conversation or give a lecture while one’s conscious mind is elsewhere.)

A key difference comes in recognizing that there are other minds with contents different from one’s own. This is a basis for self-awareness, intentional communication, and much more.

Roxane Campeau

I’m always impressed when I’m exposed to a scenario like Prof. Baumeister talk. It requires such an impressive amount of knowledge from different domains and perspectives.

However, in regards of this particular scenario and considering this part of Prof. Baumeister’s answer just up there (I’m copying it just to make it clearer)

"A key difference comes in recognizing that there are other minds with contents different from one’s own. This is a basis for self-awareness, intentional communication, and much more"

I’m wondering how this scenario is different from one that could explain the origins of ToM. I know a lot of people did this connection on FB, but since no one seems to have posted it on the blog, I would like to ask:

-What is the difference between Consciousness problem seen as the OM problem and the ToM? In other words, how much this great scenario could explain the origins of ToM?

Vincent LeBlanc

Being the devil’s advocate here, but your thoughts imply other animals are conscious. We haven’t solved the other’s mind problem yet, so suggesting other animals feel to disprove an hypothesis is not valid in my humble opinion.

Frédéric Banville

From that perspective, we have no reason to work on consciousness at all, seeing as I can’t even be sure anyone else has a mind. And since some animals exhibit the behavioral correlates of feeling, and since that’s enough for us to decide that other humans feel, then we have no reason to think that feeling is an exclusively human phenomenon.

Frédéric Banville

And prof. Harnad would point out that we’re conflating the other minds problem and the mind-body problem, I think!

Félix Mongeon

Vincent LeBlanc is actually really talking about the other’s mind problem (we cannot know if someone else feels) and not the mind-body problem (what is the causal role of feelings?)

Frédéric Banville

I know. He’s bringing it up to question the assumption according to which whatever definition of consciousness we come up with has to apply to animals. His point is that if we haven’t solved the other minds problem, then we have no idea that non-human animals have a mind (and are therefore conscious and feel). And if we do not know that animals feel (because we have not solved the OM problem), then saying "a theory of consciousness that does not explain animal consciousness is a bad one" is wrong-headed because we don’t even know animals are conscious.

My first point is that if the OM problem is not solved, then humans cannot be said to be conscious. Since we take humans as conscious on the basis of behavioral correlates that are (in part) exhibited by some animals, we are justified in requiring that a theory of consciousness can account for non-human animal cases.

My other point is that the OM problem is not really relevant, the real problem being the mind-body problem.

Stevan Harnad

Yes, I am assuming that the more basic level of consciousness is present in other animals: they feel pain and pleasure, and so forth. When you accidentally step on your dog and it yelps and scrambles away, for example, the assumption is that it felt pain and that feeling mediated its response. I suppose it would be possible to explain its behavior without assuming it feels pain. But this is difficult to sustain if you live with animals.

The more advanced level of consciousness, conscious thinking, is in my view pretty much limited to humans, though our closest primate relatives are moving in that direction. But they do not really pass all the theory of mind tests (just some of them).

Knowing that one exists as a mind as part of a community of similar minds is a basic and universal human experience. Much of our conscious thinking is devoted to
As a social psychologist, I'm not very excited about trying to prove or disprove the existence of other minds. It is such a basic fact of life that it should be a foundational assumption, not a dubious hypothesis. Dealing with other minds is essential to how we operate as human beings (including what we are doing right now, in this exchange!), and so the challenge is to understand what mental capacities and processes are needed to make that possible. The capacity for conscious thinking, in the form of mentally representing sequences of ideas that are not direct stimuli, may be crucial for that.

Izabo Deschenes 4 July 2012 08:14
I was under the impression he defined that he would be discussing 'human' consciousness, what has been called a 'higher' form as opposed to Dr. Morsella’s more basic definition of consciousness. Furthermore, how do we know the pinworms are feeling ouch and not just detecting/sensing and responding (like robots or how Dr. Sossin’s argues aphasia do not have consciousness). I guess this also relates to Vincent’s comment I just saw about the other’s mind problem. However, if the ‘human’ consciousness is mostly related to the development of being social beings, are there not animals with highly evolved social structures? Where would we draw the line where we agree certain animals have this consciousness or not?

I also found quite interesting the point made by one of the questions asked, about how related his discussion was to language, and maybe it is more an explanation of language than consciousness itself.

(enrolled in the course)

Izabo Deschenes 4 July 2012 08:40
Also, just thought of this and I may be way off, but would there be any way to relate Dr. Baumeister’s social explanation of consciousness to Dr. Haggard’s (I hope I am not misquoting or completely misunderstanding him) but during the discussion session at the end of the other day where he speculated that perhaps the evolution of consciousness was somewhat related to the concept of responsibility (in social context)?

Stevan Harnad 8 July 2012 18:38
ROY BAUMEISTER’S REPLY
Izabo Deschenes cluster

Yes, certainly there are animals with complex social structures but presumably without the full degree of human consciousness. Still, those structures lack some vital features of human consciousness.

It is less social life per se than culture that is the key. I have argued at length that what makes us human is not being social animals but rather being cultural animals (see Baumeister, 2005, The cultural animal: Human nature, meaning, and social life, Oxford University Press). Culture depends on language – all known cultures use language, for example. Culture is also based on sharing information and on using flexible systems for joint action based on multiple complementary roles.

The relationship between language and consciousness is quite important and I was sorry not to hear any talks dealing with that, though I suspect you have had them elsewhere in the summer institute. Language is a tool for using meaning, and the incorporation of meaning into mental processes may account for some of the distinctive features of human conscious thinking. Sartre argued in Being and Nothingness that consciousness blends being and nonbeing, as in seeing what is there in contrast or other relationship to what is not there. In my view this is a profound insight that has been missing from much discussion of consciousness. The meaning of something relates (by association and distinction) it to other phenomena and thus transforms the 'feel' of it. For example, you can look at the table and see that your keys aren't on it. A non-conscious being has trouble doing that. A computer, for example, might scan the table but to ascertain the absence of keys it has to have a second representation of what the table would look like if keys were on it and then compare the two representations, and it has to be programmed to say in the latter case that the keys aren't there. The human experience of lack seems more direct and doesn't require that sort of programming.

Izabo Deschenes 31 July 2012 23:36
Thank you for the reply!

Diego Mendoza-Halliday 4 July 2012 08:52
CONSCIOUSNESS IS NOT ALL ABOUT SOCIAL BEHAVIOR: The idea that consciousness evolved to allow organisms to be social is a total simplification. I have a much stronger preference for Damasio's general idea that consciousness conferred organisms somehow an advantage in seeking homeostasis overall. In that framework, social behavior is only one of millions of things that organisms need to do to maintain homeostasis.

Bruce Anderson 4 July 2012 19:46
You seem quite adamantly about your stance. The growth in human brain mass (cranial capacity) has been closely linked to evidence of social group size. There is a serious evolutionary cost for increasing brain size, so (while it is not "proof") it isn't difficult to presume that at least some part of the brain increase is related to hominin social groups. Once you've accepted that, the next steps to suspecting that language and consciousness (not the same) are also related is easy.

Am I speaking of higher levels of consciousness than "just" feeling? Probably - I still haven't internalized or made sense of the question of what is the minimal requirement for basic consciousness.

Félix Mongeon 4 July 2012 20:56
Diego and Bruce, you use the term consciousness to refer to the higher-level capacities implicated in manipulating thoughts (and this is actually how Pr. Baumeister used the term also, he did not refer to feelings). I agree that those higher-level capacities have many different functions and thus their development cannot be explain solely by the advantages they confer in social communication. I want to point out also that Pr. Baumeister did not explain how a zombie would be unable to teach his child not to put his hand in the fire (that is the example he gave). In fact, he just stated it as if it should be taken as granted that feeling is required for cultural transmission. This is nonsense. Cultural transmission is doing, it has nothing to do with feeling. I think I repeat a bit what Pr. Harnad says about doing and feeling, but I find it really misleading that those two key concepts are so often undistinguished by many speakers.

Stevan Harnad 8 July 2012 18:39
ROY BAUMEISTER’S REPLY
Mendoza-Halliday cluster
The opening comment seems quite forcefully stated but doesn’t quite make sense. First, again it is necessary to distinguish the animal style consciousness from human conscious thinking. Being social is not required for the former, but it certainly could be for the latter. Also, again, my argument has to do with being cultural, as a highly advanced special case of being social. As to the argument about homeostasis, well, that seems vulnerable to the same complaint you thought you were making about my view. Plenty of organisms maintain homeostasis without consciousness, and certainly without human conscious thinking.

Nico Sheppard-Jones 31 July 2012 12:19
It would indeed have been useful if every speaker had explicitly put forth their working definition of consciousness. Dr. Baumeister clearly is referring to a very specific type of conscious process, namely human conscious thought. This example demonstrates yet again that we cannot do away with Professor Harnad’s so-called ‘weasel words’. Terms such as meta-cognition, consciousness and feeling can all be put together in a framework in which all refer to a specific subset of mental events.

Reply

Frédéric Banville 4 July 2012 09:12
The idea that the purpose of the brain was to enable social interaction struck me as strange. Sure, the brain is extremely useful for that in humans, and presumably in other social animals, but finding out what the brain is for should start by an investigation of what organisms with a brain (or brain-like structures) have in common. According to Wolpert, it’s that they all need to control action.

I’ll leave a link to his TED talk, as I don’t have any references close at hand, but I’ll get some when I can.
http://www.ted.com/talks/daniel_wolpert_the_real_reason_for_brains.html

Frédéric Banville 5 July 2012 06:14
He stated that the purpose of the human brain was to facilitate social interactions, which I take to mean that in the case of humans, the brain has a mainly social function. A charitable interpretation would be the following: the human brain has evolved for the same basic functions as that of other animals with brains (action control) but has specific adaptations which make it really, really good at facilitating social interaction.

I was being uncharitable, granted. But I still think there should be some form of nuance here. If the focus was less on these distinctively human features, I think we’d have a more interesting basis for developing a theory of consciousness.

Stevan Harnad 8 July 2012 18:40
ROY BAUMEISTER’S REPLY
Banville cluster

I see the same issue here of confusing basic animal consciousness with human conscious thought. I assume that we have something in common with other animals, including the control of thought. Indeed, the origins of the central nervous system are in digestion and locomotion: moving around to get food. Nothing social there. But if you want to get food the way modern humans do, such as purchasing it at a grocery store or supermarket, you’d better be conscious. You need to be aware of yourself as a mind among a community of minds, to understand how to interact with them based on shared assumptions (e.g., how money works), and so on.

In my talk I spoke separately about the purpose of brains per se (taking in information and using it to guide action) as opposed to the purpose of the specifically human parts of the human brain. The latter I think more and more is to enable the person to tap into the group, understand its systems for doing things, share its stock of information, and so forth.

There will not be a single solution to the problem of explaining consciousness. First it is necessary to explain the minimal, basic requirements for the original, basic forms. Morsella and others have focused on this. This is where controlling action (e.g., to escape damage, as signaled by pain) is vital. The second problem is to explain the much more complex and advanced form of consciousness that our species has.

Bernard J Baars 4 July 2012 11:08
Great to see you here, Roy. I’ve felt for a while that I wasn’t really addressing the questions you wanted talked about at the conference. I would like to do that if possible.

On the cultural environment, while that is clearly one of major functions of consciousness in social species and humans in particular, the mammalian brain basis of consciousness goes back 200 million years. That’s not counting ancestral (vertebrate) aspects of consciousness, but it’s good to stick with mammals, because the anatomical basis is so clear.

So that includes “lower” animals as well as social animals. All of them are conscious. All of them have perception and voluntary control. One could argue that all mammals have at least TWO social periods in their lives, namely infant-mother bonding and mating. But those acts can be quite isolated.

Martha Shiell 4 July 2012 16:35
How are you defining the “mammalian brain basis of consciousness”?

Stevan Harnad 8 July 2012 18:41
ROY BAUMEISTER’S REPLY
Baars comment.

Hi Bernie, we were sorry you didn't make it. That's the second time I've missed out on the chance for an extended conversation with you!

See my comments above. People seem very confused about whether we are explaining basic phenomenal awareness (exists in loner animals, and serves basic functions of integrating stimulus and response, plus coordinating information scattered around brain and mind) or human conscious thought (with self-awareness, abstract reasoning, symbolic understanding, etc.). Are you suggesting your consciousness is nothing more than what simple solitary animals experience?

Carey YL Huh 4 July 2012 14:51

If my note is correct, Dr. Baumeister summarized the subliminal priming research saying that the unconscious can only process words and not sentences. But isn't that because these stimuli are so brief that we are not giving the unconscious enough time to process all the info when we present sentences, thus a limitation of the experimental method used? From the split-brain research and hemi-neglect work, isn't it clear that subconscious processing can interpret meanings from somewhat complex stimuli like a schematic picture of one side of the house burning? And I wonder how sophisticated a word can be processed subliminally for meaning extraction?

Bruce Anderson 4 July 2012 19:18

I believe it works the other way around - if the experimenter presents more than a single word (or even a long or complex word), the conscious mind intervenes and it is no longer subliminal. Same reason for the brevity of presentation - if it shows for too long, the conscious mind jumps in.

Stevan Harnad 8 July 2012 18:42

ROY BAUMEISTER'S REPLY

Huh cluster

Relevant evidence is covered in our 2010 Psych Review article, and some of it was acquired from Baars's TICS paper. In dichotic listening, the unconscious has all the time it needs to process all the words in the unattended channel. It responds to single words embedded in that channel but not sentences. Also look at our logical reasoning studies (Consciousness and Cognition, 2008).

Carey YL Huh 9 July 2012 20:57

Thank you, Drs. Anderson and Baumeister for your comments.

I will definitely have to read the literature myself, but I am not completely convinced that the unconscious cannot process more than words because of the evidence shown by Dr. Lau at his talk. The seemingly distinct views of yours vs. Dr. Lau, on this subject, I hope, is not because of differences in semantics! This is one sure thing that I learned from the conference: we just cannot agree on what we mean by consciousness. It's probably likely then that we don't agree on what is unconscious!

Martha Shiell 4 July 2012 16:32

Baumeister highlights the selection pressure that arises from social living. This is consistent with SI theory, in that optimal social interactions may be in conflict with reflexive behaviors, and consciousness represents the "felt" control of these reflexive behaviors.

Stevan Harnad 8 July 2012 18:42

ROY BAUMEISTER'S REPLY

Shiell comment

Yes! But it also does more than that, of course. Much of conscious thinking is not involved in the direct control of action, such as restraining reflexes. But most of it is devoted to dealing with other people and the cultural system in general.

Roberto Gulli 4 July 2012 18:59

Dr. Baumeister's talk, together with Dr. Cisek's provided an alternate theory of consciousness and its adaptive advantage, far beyond the characterizations of consciousness as a simple presence of awareness or feeling we have receive thus far.

One provoked thought from the talk: consciousness is not merely the (inferred) presence or absence of feeling, but the ability of an organism to experience a feeling (insert any SH synonym here), and relate and integrate these feelings across time and space, such that any experience can be drawn on for one's future utility, and shared amongst kin.

Alexandre Duval 4 July 2012 19:20

Here's one Harnad-inspired thought: Baumeister has strong arguments that conscious processes are useful for social and cultural interactions. However, all these conscious processes could be effected without consciousness. (Take logical reasoning, for instance. We can easily write computer programs that make logical inferences when given various premises as input, but nobody would claim such programs are conscious.) So why are those processes conscious? Could Baumeister appeal to something like Baars's global workspace theory to answer this question?

Félix Mongeon 4 July 2012 21:08

Global workspace theory is about neural events, which is doing and not feeling. Thus, I would say no. Also, there is no explanation about why the coordinated activity of a system, which is postulated in the global workspace theory (if I understand it well), should be a sufficient condition for feeling. Such coordinated activity is also about doing.
**Stevan Harnad** 8 July 2012 18:43
ROY BAUMEISTER'S REPLY

Duval cluster

Would be interesting to see what the philosophers say about whether computers really perform logical reasoning. In my view, if they do, they are simply doing what human minds have programmed them to do. Computers don’t exist in nature, only in culture, and indeed on earth that means human culture. I’d be willing to bet even if we find life on other planets, it won’t be making computers without conscious beings who design them as part of a cultural system of (very considerable) accumulated information.

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**Noemi Stern** 5 July 2012 07:58

I'm not entirely sure this question makes sense, but here goes: If the social sharing of information is the fundamental human trait that enables the success of our species, then how can you explain selfishness?

I take what Baumeister said to be very horizontal in terms of information/sharing. Being selfish takes the others out of the picture and one puts oneself and their needs above everyone else’s. So what I don’t understand is how the notion of selfishness came about? Why would one want to be selfish?

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**Stevan Harnad** 8 July 2012 18:44
ROY BAUMEISTER’S REPLY

Stern

Ha, yes, selfishness is good. In my book on human nature (The Cultural Animal: Human Nature, Meaning, and Social Life, 2005, Oxford U. Press) I use that as a good example of nature against culture. Nature gave animals brains so that they could take care of themselves and their kin. Thus, genetic selfishness is natural. Cultural systems require some suppression of selfishness in order for them to function. People must, for example, wait their turn, respect the property of others, pay taxes, maybe risk their lives in battle, all of which go against selfishness. Moral rules (found in all cultures, I believe) are essentially exhortations to restrain selfishness and do what is best for the group or system as a whole. Consciousness is needed for that.

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**Marjorie Morin** 5 July 2012 18:32

Well you don’t come to life being selfish, you depend on others to grow, learn and survive. You would just by that be a social animal (and then need consciousness as Baumeister pointed out). What could be an answer is that as an organism your main goal is to survive and procreate so that your genetic line continues. Being selfish is one way to survive. You can see that in the animal world too, they call them "cheaters": they use others to get what they want. In fact you are using the cooperative behaviors of other so that you don’t have any cost to pay to have what you want. So it might not be an "adaptative" behavior in a social world but it’s still useful to survive without having to pay that much a cost.

In fact yes a baby is "selfish" (have to be!) but you get what I mean!

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**Maxwell J. Ramstead** 6 July 2012 13:52

I found very intriguing the idea that consciousness is the place where the unconscious constructs meaningful sequences of thought. Perhaps there is something intrinsic to conscious representation that allows specifically for such a dynamical linking of representations one to the other. I have the feeling, however, that we may be conflating the causal role of consciousness for the causal role of attention in conceptions such as these. Indeed, following Doctor Graziano, I would suggest that the coordination implicit in the construction of meaningful sequences of thought would be realized by attention, rather than felt consciousness.

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**ROY BAUMEISTER'S REPLY:**

Ramstead.

Thanks, not sure what to say. Is attention without consciousness possible? Attention and simple (animal-style) phenomenal awareness goes back far. Human consciousness adds something else.

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**Maxwell J. Ramstead** 14 July 2012 11:39

Thank you for responding, Doctor Baumeister.

I would argue that the literature seems to indicate that attention without consciousness is possible. Many studies suggest that using unconscious primes can reduce reaction times for experimental tasks. Priming has become a standard experimental procedure. The priming stimulus is usually not reported as consciously experienced by the subject—yet, the subject’s reaction times are often reduced with the introduction of priming. That is to say, the subject reacts faster to the task at hand because of a priming cue, this despite her being unaware of the priming stimulus within conscious experience. This is interpreted as an “unconscious” process of attention modulation. That is to say, attention acts upon material that never reached the threshold of consciousness. Attention thus seems to operate at both the conscious and unconscious levels—perhaps mediating the two.

Tallon-Beaudry (2012) suggests that such examples of dissociation between attention and consciousness implies that both are separate phenomena, and can happen independently of one another. Indeed, she offers neurological evidence to support her claims: both phenomena seem to be associated to different wavelength bands.

I am still very sympathetic to an approach that tries to link serial information processing to consciousness—however, IMHO, I believe we need to be wary of not confounding our variables.
In Baumeister talk language/speech and mentalizing seem to be central for an explication of consciousness. Given that autistic patients present impairments in communication and mentalizing I was wondering if a research on autistic spectrum disorders and consciousness could be useful to find a more detailed definition of consciousness.

It might indeed!

If consciousness and social interaction with pairs are so linked, I wonder how or why do we infer consciousness to other species who's behavior can be radically different from our's. With this comes the fact that I don't think we can deny other species the possibility to have "higher order consciousness". Rather we just can deny ourselves the capacity to fully know (or to fully know that we don't know) what shape can the consciousness of other species can take.

Some years ago I suggested that consciousness pays its way in the functional economy of the brain by unlocking the savings hidden in the mutual dependencies among target selection, action selection and motivational ranking through multi-objective constraint satisfaction among them (Merker 2007, p. 70). This would place consciousness at a late stage in the brain's operations, suggesting a subcortical implementation of key mechanisms of consciousness in sites of global convergence in midbrain and diencephalon. No doubt our cortical machinery is the source of much of our conscious contents, but that does not mean that the cortex also must be the site where those contents become conscious. Recent information-theoretic analyses of the probabilistic data format of cortical operations point to the utility of collapsing cortical probability density distributions to estimate form in extracortical locations (Ma et al. 2006). I propose that this essential step in neural operations is implemented in a subcortical "global best estimate buffer" whose contents - alone among neural activities - are conscious. They are so not by virtue of anything being "added" to them in order to "make them conscious," but as a direct consequence of the format they must adhere to in order to provide a global best estimate within the narrow time constraints of inter-saccadic intervals. That format directly matches the global format of our phenomenal experience, which in its sensory aspects is that of naive realism.


Comments invited

Posted by Stevan Harnad

26 comments:

Alexandre B. Romano 4 July 2012 09:05
Two questions / problems:

1. Merker's talk seems to be more about intentionality (i.e. our relation to the world) than about consciousness (i.e. "qualia"), raw feels, feelings, phenomenal consciousness, etc.). If that's the case, he's not trying to solve the problem that's interesting us here...

2. What does this "mental model" implies? Is it a detailed representation? Here the sensorimotor approach has very good criticisms against this type of representationalism: detailed mental representation are cognitively demanding an thus are not adoptable.

Félix Mongeon 4 July 2012 21:14
I agree with the first part of your problem 1. However, as only Pr. Harnad talk has really been about the causal role of feelings and that the other questions discussed by the speakers are important, I do not see why we should consider that we are interested solely in the hard problem. I think that much energy could still be put in the hard problem and that no answer could be found. If this premise is right, the problem that should interest us is that of higher-level human capacities related to feelings, but in which feelings have no causal role.

Pierre Vadnais 4 July 2012 22:15
Isn't there a link between intentionality and consciousness? The world causes our raw feels, feelings, even "qualia" and phenomenal consciousness. Intentionality is only causality seen from the receiving end; we feel something about the causes.
Awareness is feeling the effects. Consciousness is knowing that these effects have a cause (a causal relation to the world).

**Bjorn Merker** 18 July 2012 06:11

To Alexandre B. Romano, point 1: You may remember that in my talk I dwelt at some length on the emptiness of Nagel's characterization of consciousness in terms of "something it is like". It is no more than another name for the conscious state, a tautology (please see my video for the details). I then went on to say that instead of being recognized as a tautology this "something it is like" has caused endless mischief by being taken in the sense of a property, a distinctive qualitative something possessed by the conscious state, and by it alone, as an inherent identifying attribute, elusive yet crucial to any explanation of the nature of the state it is taken to predicate. As such it has taken on a life of its own and assumed many guises, such as the putative "feel" of consciousness, a truly bizarre notion, since any "feel" that might be proper to it would have to be a content of the conscious state to be experienced, and a content of the conscious state cannot define that state itself, being contained in it. So called qualia are derivatives of this global "feel" by differentiating it into the separate "feels" of any and all conceivable specific contents of the conscious state, and obviously are even worse definientia for the same reason." That means that if "qualia", raw feels, feelings" is "the problem that's interesting us here", then "what interests us here" is not the conscious state itself, but some of its contents, and a limited portion of those contents, moreover. My talk, however, dealt with the conscious state as such, in keeping with the title of this Summer Institute, and it cannot be defined by something it contains ("qualia", "feels" or what not), however widespread that misconception might be.

Point 2: The contents of the brain's reality model are exactly as detailed as the contents of your consciousness, because the former are the latter, as I tried to illustrate towards the end of my talk.

**Stevan Harnad** 22 July 2012 14:31

**WHY DOES IT FEEL LIKE ANYTHING TO BE AN ORGANISM?**

Very complicated, Bjorn!

Nagel or not, organisms feel. And the hard problem is explaining how and why they do.

That's neither tautologous, nor does it need even to mention the weasel-word "qualia"...

**Bjorn Merker** 24 July 2012 03:02

Here is the comment, corrected for spelling:

I'd say that conscious organisms feel, and they see if they have vision, and so on. Feelings are an important content of consciousness, but no more than a content, and one among many others, such as perceptual contents (the world in which we experience ourselves as living), thoughts, etc. My objection is to elevating the fact of feelings (readily interpretable as those contents of consciousness that serve motivational guidance of behavior) to a defining attribute of the conscious state, whereas in fact they belong among its contents. On what grounds has this particular kind of content been determined to be harder to explain than sights and sounds?

The crux of consciousness theory is not explaining conscious contents, but the state that offers those contents the chance to be conscious. That is an altogether different order of problem, which forces one to come to grips with the defining properties of the first person perspective, which is the really hard problem.

**Stevan Harnad** 1 August 2012 15:01

**SEEING IS FEELING**

Sights and sounds are felt: It feels like something to see or hear. All mental states (conscious states, call them the synonym one will) feel like something to be in. Otherwise they are just states.

The hard problem is explaining how and why any state feels like anything to be in.

The self-referential loans of conscious states have next to nothing to do with this. If every conscious state did not feel like something to be in (even if all it feels like is "ouch") we would not have had this Summer Institute...

**Bjorn Merker** 15 August 2012 05:54

Sights and sounds are felt (evoke feeling) if THEY HAVE EMOTIONAL IMPLICATIONS, otherwise they simply look and sound in different ways. Those differences are differences of visual or auditory (pattern) content, and not of feeling content. To claim otherwise is to rob vision and audition of their phenomenological specificity, and to equate all contents of consciousness with "feeling". That would be to make "feeling" a synonym of "content of consciousness" (or perhaps construe it as the Nagel-inspired "additive" needed to make something conscious), which returns us to the Nagel fallacy, "feel like something to be in" is another way of expressing Nagel's "something it is like", the problematic nature of which I alluded to in my reply to Romano, and more directly in my lecture.

**Stevan Harnad** 15 August 2012 15:05

**FEELING A COOL SUMMER BREEZE**

Well, we're just going to have to differ on this, Bjorn:

I think Tom Nagel is and was spot-on (except he should have said "feels like" rather than "is like").

Nothing – but nothing at all – other than word-choice differs between asking someone what it sounds like to hear a middle C on a baroque oboe and asking someone what it feels like to hear a middle C on a baroque oboe.

And in English the word for what anger feels like and what a rough surface feels like happens to be the same, whereas in French the same word is used for what anger feels like and what burning rubber smells like. The invariant is that they all feel like something, to a feeling organism, but not to a robot, or a teapot. (And explaining the causal role of that difference is what both feels and is hard...)

But if you insist on a different terminology, just translate the challenge to explain how and why anything feels like anything to a challenge to explain how and why anything feels, smells, tastes, sounds or looks like anything.

**Bjorn Merker** 24 August 2012 10:24

You are in other words using "feels like" as a synonym for "content of consciousness", since you say that there is but a word-choice difference between "feels like" and "sounds like" and presumably "looks like" and so on. What I fail to see is the utility of specifically settling on "feel like" as the term of choice for this wide range of ordinary language ways of referring to contents of consciousness. In ordinary language "feel like" typically suggests feeling states, emotions, but that is obviously
not what you have in mind (which I realize only now). In other words, just like Nagel’s “something it is like”, your “feel” (since it might as well be “sound,” or “look,” and so on) adds nothing of substance to the neutral and generic “content of consciousness.” And of course, unconscious objects and creatures have no contents of consciousness, on that we are in full agreement. The crux of what gives something the capacity to entertain contents of consciousness, i.e. to be conscious, is the real question. My suggestion, elaborated in my talk, is that it is the first person perspective - what it is and what it is for - that supplies the key in that regard.

Stévan Harnad 24 August 2012 13:09
UNFEELT CONTENTS

Bjorn, this is all circular.

Your “content of consciousness” is just a metaphor: Baskets have contents (objects). Books have contents (words). What makes the “contents” of “consciousness” conscious is that they are felt. (And what makes words meaningful is that it feels like something to say and mean them.)

If contents are unfelt, they are unconscious.

So forget the “contents” and forget about “conscious” and “consciousness,” and explain why any state at all is felt, rather than just “functioned” (like the state of water, boiling, or the internal state of my computer, right now).

All else is just hermeneutics, hand-waving and question-begging.

Ditto for first person perspective. What makes a perspective conscious (rather than just the optical field of, say, a camera or telescope) is that it’s felt. The “1st-person” is merely long-hand for the feeler of the feeling.

Nothing is gained from all these synonyms, redundancies and weasel-words (except self-delusion about having made some sort of inroad on the hard problem of explaining how and why organisms feel rather than just function).

Guillaume Loignon 4 July 2012 09:09

Unless I completely missed the point, the position expressed in the talk does lead to infinite regress. If there’s a central locus/module/structure/thing that puts it all together, the threat of an homunculus watching that simulated reality isn’t very far.

Merker even had an image with a tiny monitor. If consciousness is the monitor, who’s looking at the monitor? Without an observer, creating a simulated reality is useless.

Félix Mongeon 4 July 2012 21:18

Guillaume Loignon, the existence brain structures that integrate information has nothing to do with the homunculus, which implies a single module that autonomously knows all about the internal representation of the world. Pr. Merker did not posit such an autonomous brain structure. His argument was much more informed about neuroanatomy.

Bjorn Merker 18 July 2012 06:40

Félix Mongeon is correct in pointing out that integrative structures, of which the brain has many, are untouched by the homunculus argument. Moreover, with regard to Guillaume Loignon’s comment, the same is largely true of monitoring functions, which are legion in engineering control systems and - I presume - are a necessary part of any model of consciousness that means to explain first person phenomenal consciousness. The ONLY circumstances under which a monitoring function leads to an infinite regress are those under which its construction literally and fully duplicates that of the system of which it is a part, because then that monitoring function must itself be fully duplicated as part of its construction, and so on. I know of no instance in the entire literature of our field that assumes such a monitoring function. I certainly do not do so. The ego-center of the neural reality model I sketched is little more than a geometric perspective point FROM WHICH contents are monitored, equipped with a winner-takes-all type decision mechanism. It is one PART of the reality model, and by no means duplicates it, so no infinite regress enters the picture.

Alexandre Duval 4 July 2012 09:17

In the period of question, Merker tried to locate the neural correlate of consciousness partly in the midbrain, the hypothalamus (and other locations, but I’m not very familiar with neuroanatomy). To give a location for consciousness seems to be a requirement for his theory since he claims that we have a model of the world that is very much ‘neurologically realized’. But the proposed location pretty much contradicts Damasio’s claims that consciousness might be in good part located in the brain stem. Does Merker’s account contradict Damasio’s findings?

Bjorn Merker 18 July 2012 06:53

No, the structures that I concentrate on are located in the upper brainstem (roof of the midbrain, ventral thalamus, etc.), and in general terms are compatible with Damasio’s perspective. When it comes to what specific structures might be included or excluded, much work remains to be done, and I certainly am only providing heuristic arguments regarding localization of key mechanisms. I provide more details than I could give in my talk in the chapter in the Edelman et al. book I referred to in my last slide (which should just have appeared in print).

Guillaume Loignon 4 July 2012 09:19

Re-reading the abstract, I think the initial idea of a processing buffer where ideas gets thrown and selected makes sense. As long as there is no little “dude” (a centralized system) looking at the buffer and doing the selection.

Bernard J Baars 4 July 2012 10:59

Very nice, Bjorn. I like your statement of the multi-constraint biologically relevant functions. But here’s a but, though it is not much of a but: Why can’t a dynamic global workspace as specified in my slideshow/narrative do that job?

Best,
potential ways to interact with the world. I will present recent results supporting some of the key predictions of this alternative way of looking at how cognitive, and motor functions appear distributed through diverse brain regions and often mixed within the activity of individual neurons. As an understanding correctly, any mammal equipped with vision would be conscious by his criteria. But what of a creature with no eyes? It would seem to me that similar probability-processing machinery could exist for other senses. If this holds, where can we draw the line between what organisms count as conscious or non-conscious?

Looking for some clarifications: how does Dr. Merker's account of consciousness and the "global best estimate buffer" apply to other, non-visual - sensory modalities? If I understand correctly, any mammal equipped with vision would be conscious by his criteria. But what of a creature with no eyes? It would seem to me that similar probability-processing machinery could exist for other senses. If this holds, where can we draw the line between what organisms count as conscious or non-conscious?

IMHO, Doctor Merker's work is an amazingly rich path toward a naturalized phenomenology. It gives an account of how one should expect representations of the lived world to be articulated the activities ongoing in the neuronal networks that themselves generate these representations. From a phenomenological point of view, this work is of great importance.

Adele Tufford 4 July 2012 21:02
Re your second question- I wouldn't take his ideas to mean anything with vision to be conscious - the creature needs the 'extra ingredient': the 'what it is like' to be looking through those eyes, seeing what they see, and doing what they do (even feeling what they feel?). I was thinking along similar lines re other senses. Dr. Merker's 'view' is certainly visuo-centric (ha ha), and his response to how this conscious construct would change in a blind individual was not fully satisfying. However, I think the constructed visual world he described & the rover analogy was surrogate to the entire unified sensory percept we experience ('sensory seeing'). However, when I think of the localization of a sound in space (arguably equally as important as vision), I feel the integration site of that sound (my 'listener') correspond anatomically (within my head) to wherever that sound IS in the azimuthal plane. YET when sight and sound are integrated I have an entirely different experience all-together.

So, where exactly is our 'vantage' point? Does it even exist? I think it is more contingent on the type of sensory experience we have, in which case I'm not sure I ascribe to the idea that one locus is the site of all conscious experience.

Félix Mongeon 4 July 2012 21:23
Nico, to pursue on your question, Dr. Merker did in fact also give the example of audition. He briefly mentioned it. I also think it is easier to talk about vision than other sensory modalities since vision is the most studied. Most discussions about sensory modalities concerned vision since the beginning of the summer school.

Maxwell J. Ramstead 6 July 2012 13:58
IMHO, Doctor Merker's work is an amazingly rich path toward a naturalized phenomenology. It gives an account of how one should expect representations of the lived body, and representations of the lived world, should be articulated the activities ongoing in the neuronal networks that themselves generate these representations. From a phenomenological point of view, this work is of great importance.

Bjorn Merker 18 July 2012 07:30
Yes, quite right, my assumption throughout has been that the neural reality model is multimodal, even though my illustrations were almost exclusively visual. An interesting point in this connection is that all the spatial modalities tie in to the gaze control machinery, which provides a strong reason to integrate them all in a joint multimodal reality model. Even when the optic nerves are severed the eyes and head turn to auditory or somatosensory stimuli. And in the few creatures that lack functional eyes, such as some cave-dwelling salamanders, the head turns in appropriate fashion.

Bjorn Merker 18 July 2012 07:34
Thank you, Maxwell Ramstead, for this hyper-compressed but precise summary of the core notion I tried to get across in my talk!

Roberto Gulli 17 August 2012 09:26
The first 15 minutes of this talk were the most clear and succinct summary of the theories espoused to explain how consciousness is generated in the brain seen at the entire Summer Institute. Thank you Dr. Merker for this.

Paul Cisek: The Vanishing Central Executive: Distributed Neural Mechanisms for Decision-Making

Abstract: Modern theories of the brain describe it as a series of information processing stages for perceiving and representing the world, thinking about it, and then acting upon it. However, this intuitively appealing and influential view is not well-supported by neurophysiological data. Sensory, cognitive, and motor functions appear distributed through diverse brain regions and often mixed within the activity of individual neurons. As an alternative, I will describe a model based on theories from ethology, which suggests that behavior involves a continuous competition between potential ways to interact with the world. I will present recent results supporting some of the key predictions of this alternative way of looking at how the brain implements behavior, focusing on neuropsychological studies of decisions between actions.

Comments invited

Posted by Stevan Harnad

37 comments:

Alexandre B. Romano 4 July 2012 12:00
I'm not sure I understood the distinction between « classical representations » and « pragmatic representations ». Any details about that issue ?

Shady Rahayel 4 July 2012 12:04
Descriptive representations are explicit and objective representations of the world (the fact that a car is a car). Pragmatic representations are implicit and subjective representations of the world and are active in the interaction between an individual and the world.

Emma Cusumano 4 July 2012 12:07
I think, if I understand correctly, the biggest distinction is that classical representations are "objective," in that we represent the outside world separate from our interactions with it, e.g., we can perceive a bottle of water regardless of whether or not we're thirsty. Cisek is suggesting that the sensorimotor system is directly involved in decision making, and as such, our representations are related to our subjective state and specific environmental affordances.

Louis Chartrand 4 July 2012 12:28
I take it to be along the lines of what Gallagher calls "traditional representations" and "minimal representations" (among which you find Millikan's "pushmepullyu representations" and Clark's "action-oriented representations"). http://philpapers.org/rec/GALAMR

Paul Cisek 4 July 2012 18:30
Right - you've all understood what I was getting at. I'm not so familiar with Gallagher but what I call pragmatic representations are pretty much what Millikan and Clark were talking about. Some might say that they're not "representations" at all, but I think the terms are useful because they allow us to think about such things lying on a continuum.

Furthermore, they let us ask how descriptive representations might have evolved from pragmatic ones. For example, a very simple organism might have only a pragmatic representation of a food source, confounded by its state of hunger, because that's what it needs to select useful actions in the here-and-now. But a more advanced animal that has the capacity to refer back to prior experience would benefit from specializing at least some of its representations to be free of that state-dependence - yielding what Tolman would call a cognitive map. Of course many animals (all of whose brains are evolutionary "works-in-progress") might have something in-between.

Maxwell J. Ramstead July 2012 13:47
I find it very interesting that "pragmatic" representations, which specify action selection and specification, are reminiscent of what a phenomenologist would call "presentification". Pragmatic representations flesh out the notion underpinning much of phenomenology, according to which meaning stems first and foremost from interaction with, and coping with, the external environment. I am in complete agreement with Doctor Cisek’s assessment of the situation, and coming from phenomenology I find this work very refreshing.

Paul Cisek 6 July 2012 20:03
Thanks Max! Mike Shadlen and others keep telling me that I need to read Merleau-Ponty because all of that is in there. I'm sure that is true - this is an old idea that has appeared in many forms.

Louis Chartrand 4 July 2012 12:57
I get the impression Cisek strawmaned computationalism to make for a convenient enemy, but computationalism could totally be built on top. After all, we do think serially at some level – I certainly can't process language from two sources at the same time. You can have parallel, affordance-competition processing at one level, and serial symbol processing at the other.

Martha Shiell 4 July 2012 16:47
I would like to understand your point better (It will help me understand Cisek's ideas). Can you expand on your example of processing two languages simultaneously. How does this represent serial processing?

Louis Chartrand 4 July 2012 17:25
I can't read from two places at a time. If I put music while I'm, it needs to have little or no speech. In fact, if I'm interrupted in my speech, I might also have trouble going back to where I was. This might indicate that when it comes to higher order symbolic functions like speech and rational thinking, we could be processing ideas one at a time (serially) – otherwise we'd be able to process two or more at a time (in parallel).

As a matter of fact, I'm not sure it is the case, but people will build computationalism on top of dynamic and/or embodied models (e.g. Susan Schneider in philosophy and Chris Eliasmith in computer science).

Bruce Anderson 4 July 2012 19:05
@Moka - But isn't the fact that you can't read two sources at the same time a consequence of reading requiring conscious attention? And conscious attention cannot operate in parallel.
Paul Cisek  4 July 2012 19:49
My point is not to deny that serial processing exists, but to argue against using it as the foundation for our theories of behavior and the brain. From comparative
neuroanatomy we know that the basic architecture of the vertebrate nervous system was laid down >100 million years ago, and largely conserved since then, even in
humans. That architecture could not have been adapted to serve the needs of abilities that did not exist at that time. So the examples you give are important and
nobody wants to deny them, but I don’t think we should build our fundamental theory of neural organization around them.

Furthermore, even to understand recent abilities (which may be well described by serial models) it is important to first think about the context within which they
evolved. If I were to guess, I’d speculate that such abilities are specializations of the selection system(s). In fact, I think it’s interesting that the mechanisms some
have proposed for serial sequencing of action selection (see Bullock’s 2004 TICS review on competitive queuing models) have an “if-then” structure that could be
elaborated toward something like the production systems of classic AI. So the mechanisms of reasoning could just be extensions of earlier and less abstract
selection mechanisms. This is very speculative, of course, but it makes some neurophysiological predictions that could be tested.

To summarize - I think it’s useful to look at evolution (the “descent with modification” bit) as a roadmap for building our theories.

Eric Muszynski  4 July 2012 13:48
I feel like this is a somewhat naive question, but still:
Cisek’s proposal is that the brain entertains ‘all potential actions’ at once. Yet there needs to be some limiting of the infinite number of potential actions to begin with. How
does that happen?
Of course this question can apply to any decision-making model, since any decision involves potential actions...

Martha Shiell  4 July 2012 16:44
The infinite number of potential actions are limited by physical constraints and the goals of the action. Think of the zebra running away from the lion towards the
river... is there more than two potential actions by the zebra in this case?

Louis Chartrand  4 July 2012 17:35
If you want to push the question a bit and get a more processsorial, less intuitive answer, I’d say: he mentioned affordances. Affordances is the idea that the features
you notice and retain in objects are the ones which suggest its usage (e.g. a handle is a “to-be-twisted”) – so it’s a function of both the object and the organism (and
its goals). There are psychological and mathematical models for that...

Paul Cisek  4 July 2012 19:24
It’s a great question, and I think it has three mutually compatible answers. The first is Martha’s - that the number of potential actions is already limited by the physical
constraints of the environment at any given moment. Second, I think it’s not so much a matter of the “number” of actions but of the resolution of the parameter space
in which they are represented. Studies of reaching suggest that once potential movements are within 60 degrees, they start to get mixed (Ghez et al. 1997, EBR), so
perhaps only about 6 planar reaching movements could be represented at a time, each as a “hill” of activity that is fairly broad. Once more degrees of freedom enter
the picture, the numbers get larger, but it’s never so large as to cause a computational explosion. Finally, selection should be operating throughout the sensorimotor
loop, reducing the options as they go from “targets on retina” to “directions for moving my right hand”. Many studies have shown that things get progressively more
sparse as you record further and further down the dorsal stream.

Alexandre Duval  4 July 2012 18:47
Sort of a follow-up on Louis Chartrand’s post: I think Cisek makes a good case that the model of decision-making often associated with computationalism (where
genral action planning always occur before specific action selection) might be seriously wrong. But it seems to me that this decision-making model is not intrinsically
related to computationalism and that he might be a little bit too quick to take this as general objection to computationalism. Many computationalists are only committed to
the view that propositional attitudes are relation to syntactically-structured representations (as opposed to distributed representations, the sort that connectionists are fond
df). They can still allow for the existence and causal power of ‘pragmatic representations’ – provided those are not identified with propositional attitudes and provided that we
also have syntactically-structured representations that have a causal role.

Paul Cisek  4 July 2012 20:09
Actually, my ideas on decision-making are not the basis of my general objections to serial computationalism - it’s the other way around. I think the problems with
computationalism go far beyond decision mechanisms and have more to do with that general input/output picture of behavior that (I think) we inherited from dualism.
An animal is a control system, or a “special case” of an input/output system in which the output influences the input. Computers don’t do that (usually). So to
describe the brain as an input/output system without considering its control loop structure is a bit like describing cars as energy conversion devices without adding
something that distinguishes them from chloroplasts...

So it’s my objection to computationalism as a theory of behavior which leads me to think about “decision-making” from the perspective of sensorimotor control.

But as I replied to Louis Chartrand above, I don’t deny that some things are serial, and that some descriptive representations are useful. I just don’t think it’s a
good foundation and should not be as pervasive in the brain sciences as it often seems to be.

Adele Tufford  4 July 2012 20:42
I thought these were some great ideas. I was wondering if Dr. Cisek could respond as to how he thinks this model plays into not only decision making but parallel
perception strategies, a la Dennett's Marilyn Monroe room: we walk into a room plastered with 1000 Marilyn Monroes and can near-immediately identify all as the same
without having to inspect each one.

How do we get by in such a scenario without a central executive?
You look at one and you have a Marilyn Monroe feeling. You keep looking, no different feeling. You quickly reach, by induction, the conclusion that they are all Marilyn Monroe... even if there is a Groucho Marx in there. If you happen to see the Groucho Marx, you might revise your conclusion and look more closely at the other 999. Why would you need a central exec in your Central Nervous System? The CNS IS your central exec.

That’s a great answer. I couldn’t have said it better myself. This is also (I suspect) what Mike Shadlen would say: We interrogate the world, not re-create it inside the head and then look at it again.

Ok... now keep an open mind...

Prof. Cisek’s specification processes occurring in parallel with the selection processes and Prof. Morsella’s conflict-resolution processes got me thinking about this hypothesis about the function of feeling. Let me know what you think.

Just as the problem of explaining how the brain works is an underdetermined problem, the problem faced by the brain to build a model of the world is also an underdetermined problem. Now, attentional processes are usually defined as selection processes where some information is chosen while the rest is dropped (or inhibited). Thus, whenever a model selected proves to be unsatisfactory, a new model has to be built.

Now... imagine the evolution advantage that would represent the possibility to build AND MAINTAIN many different models of the world at the same time. Whenever one doesn’t work out well, another one is immediately accessible. However, if you could attend to all models at once, potential actions would most probably conflict. You therefore would need a mechanism by which you could consider only one of them (without dropping any of the other models). Wouldn’t then feeling happen to be a great way of dealing with that problem.

Let’s say at time t, you have models of the world A, B, C and D. Now if you should use attentional processes in order to select model A, models B, C and D would be lost.

How could they be all selected, all simulated in a temporal frame, but would not conflict with each other for behavior? Feeling appears to be a great solution for this. If this hypothesis should be correct, it would describe the function of feeling. The mechanism by which that would be made possible would remain to be postulated.

You could see in this an analogy with the “many-worlds” interpretation of quantum mechanics, where many alternative histories and futures are real.

Now I said at the beginning to keep an open mind! Given finding a function for “feeling” that could have been advantageous through evolution appears so difficult, this "many-world models” hypothesis is something to consider! How else than feeling could we attend to a world model WHILE representing and simulating every other possible ones (or at least some other models given physiological constraints...)

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Evidence for this on two ends of this continuum comes from two rather different areas of research. On the lower-order end, there is substantial neurobiological work that has convincingly established that visual stimuli are simultaneously represented as percepts AND action sequences even on the level of simple visual features such as location, color, etc. For more information on this, look up the "theory of event coding" (TEC) by Prinz et al. To summarize, though, the principal goal of this theory is to account for how we can make simple visual-feature-to-motor-response associations, such as you might during an experimental task during which you have to report the appearance of a green stimulus of variable shape and size with a rightward arm movement, and a red stimulus with a leftward movement. In this context, the simple visual features of color become associated with a directional motor behavior, rather than some unitary whole object or tool. To reiterate, this is important because it shows that the essential definition of an "affordance," as a perceptual representation specifying sensory AND behavioral information simultaneously, is not limited to the object-level but can apply to lower-order visual features and simple movement parameters as well.

Contrasting examples of affordances scaling up to more abstract levels of description come from social psychology, specifically studies of behavioral modulation by visual priming. The big name to look for here is John Bargh and his work on automaticity and social priming. To quickly take two examples, you can subliminally flash objects associated with categories of social behavior, such as a hammer or gun (for priming the behavioral category of 'violence') or a briefcase or person in a business suit (to prime the goals of dominant or competitive behavior colloquially associated with 'business' in general). This is important for the affordance concept because it demonstrates that objects can specify behaviors in more abstract terms than simple chains of discrete motor behaviors -- rather, they can 'suggest' abstract categories of social behavior to human observers properly equipped (cognitively, and by socialization) to perceive them.

Now we can (finally) come back to your original comment about 'negative affordances.' I would suggest, on the basis of the above, that affordances can indeed be 'negative', in the sense that a lion could 'afford' a the behavior of withdrawal by associating the percept of lion with the behavioral parameter of "move away ASAP." Alternatively, this association could be made at higher or lower levels of abstraction; maybe you will connect the withdrawal behavior parameter with teeth, or anything that roars, or to all objects falling within the category of 'predatory felines,' etc etc. Such a behavioral association is possible because there is nothing intrinsic to the notion of affordance-based perception that prohibits them from being 'negative' in the sense of specifying withdrawing behavior, because the brain's ability to tie behavioral parameters to particular patterns of sensory input is not limited to approach behaviors.

Lastly, in the specific context of Paul's talk, it's important not to neglect the centrally located "biasing" mechanisms. The ability of the brain to flexibly apply motivational valence to environmental affordances in a contextually-sensitive manner allows for different contextual responses to otherwise identical affordances. To take a slightly silly example, if I put an electrified mug in front of you, you could 'bias' your selection systems against selecting a grabbing movement by biasing the mug affordance with an aversive motivational signal.

That's my two (hundred?) cents. Paul -- what do you think?
Michael Shadlen: Consciousness as a Decision to Engage

Abstract: Consciousness encompasses a variety of functions and properties, such as awakening, awareness, and subjective aspects of both perception and volition (e.g., qualia and authorship, respectively). It remains to be seen whether these diverse functions are related to one another through common neural mechanisms, and if so how. Here, we advance the thesis that the neural mechanisms that give rise to conscious states share features with neural mechanisms that underlie simpler forms of decisions. The neurobiology of decision-making provides detailed insight into how the brain deliberates and reasons from evidence to make choices. The underlying mechanisms, mainly studied in animals, could support a variety of complex cognitive functions that probably operate independently of many aspects of consciousness. For example, many complex decisions in humans rely upon wakefulness but not upon awareness or authorship. In animal studies, decisions are typically embodied: they can be described as selection among possible actions. By substituting ‘circuits’ for ‘actions’ in the preceding phrase, we generalize from ‘deciding to do’ to ‘deciding to consider’ or, more generally, ‘deciding to decide to...’ This is an appealing notion from the perspective of brain evolution, because it allows us to recognize ideation as an elaboration of a simpler sensory-motor design. We propose that many of the functions of consciousness are simply ways of engaging the environment. Thus consciousness might be mediated by (non-conscious) decisions to engage, as in awakening, or to engage in a certain way, as when attaching narrative to action. Although the neural mechanisms underlying ‘decisions to engage’ are unknown, they are likely to involve intralaminar (and matrix) thalamus and processes that ‘decide’ to turn other circuits on. This idea invites an analogy between the functions of brain regions that project to matrix thalamus, including the ‘default system’, and the role of parietal cortex in perceptual decisions. While highly speculative, we think ‘decision to engage’ provides a biologically plausible and computationally coherent hypothesis about the neural correlates of consciousness. (From Shadlen & Kiani 2011)


Comments invited

Posted by Stevan Harnad

10 comments:

Alexandre Duval 4 July 2012 16:03
This was a very informative presentation, but I wonder whether Shadlen might be making some unjustified assumptions when he jumps from claims about neuroanatomy to claims about consciousness and decision-making. In the abstract, he writes: “The neurobiology of decision-making provides detailed insight into how the brain deliberates and reasons from evidence to make choices.” But, as one person noted, it is not clear that the experiments which he discussed really tell us how and where the decision was taken in the monkey’s brain when it decided to go for the red or green circle. All the experiments showed was that some neurons were good indicators of the monkey’s decision and were fine-tuned to choose the circle which brought a reward. But, for all we know, the decision-making process might have already started before the neurons in LIP react (or the neurons’ reaction might be only the first step of the decision-making process). If that is right, then we still don’t know what decision-making in this case really involves.

Michael Shadlen 5 July 2012 08:32
All reasonable points. I did not tell you everything we know about the process in these tasks. The importance of the reaction time version of the task derives from the constraints it places on the estimate of decision time on single trials. Please consider those fits of the monkeys accuracy and reaction times on the random dots experiment (the slide with the equations). It produces an estimate of the time that was that used and not used to reach the decision. The latter corresponds beautifully with the physiology. That is, the stereotyped dip before the decision related activity begins [colored curves begin to separate by motion direction, strength [slide with Jamie Rotman’s picture] and the time at the end after the responses come together (the sign of termination) but before the actual eye movement. In these experiments, the agreement is unlikely to be off by more that 10-20 ms. There’s much more I can say about these delays. But there are many reasons you should regard these neural responses as informative about the decision process.

There’s plenty we don’t know, of course, even about these neurons. I describe the process as integration, but we don’t know how that is achieve at the circuit level. I showed you evidence for a terminating bound (or threshold), but we don’t know how that threshold crossing is implemented and suspect it is not in LIP (although LIP...
I enjoyed Shadlen's presentation and his incredibly impressive experimental design. Although I appreciate his straightforward approach in the search for 'neurological' consciousness, I think the claim that a philosophical consciousness can be written-off is stretching this data. The 'post-decision wagering' experiments give insight into the probabilistic computations a neuron performs when presented with a distinct visual task, but I do not think this represents the entire decision-making process. If this neuron is indeed the site of visual appraisal, there must additionally be an entire feedforward and feedback relation with memory/reward centers modulating the monkey's confidence index (if you will). Nor does this explain how, in the context of a less structured scenario (say, swinging through a tree and having to make accurate visuo-spatial analyses of potential prey), one would choose what to flag and attend to in the first place.

Thanks for this comments.

1. My point is not to write off P-con. The thesis is that it is mediated by neural mechanisms that are similar to the ones that mediate the more pedestrian N-con. One can understand both as a decision to engage. This insight is useful because, if correct, it implies we know much more about the process than one might imagine. That's because we know so much about the neurobiology of decision making.

2. Your points about the limitations of our paradigms are well taken. For example, I did not talk about the decision to choose the sure-target on the post-decision wagering task. I showed you that the evidence for this choice is (i) the state of evidence used to make the left-right decision and (ii) elapsed time. I didn't show you all the physiology in support of this claim, but that's in the Science paper. It's an open question whether LIP or orbitofrontal cortex or ACC or vPMC or ... (or any combination) are involved in converting this evidence and elapsed time into a commitment to take the sure-target or not. We don't know yet.

3. Re "how...one would choose what to flag...in the first place." That's a key insight. Yes, we do not understand how context leads to a decision to engage motion in one part of visual field as something that bears on the salience of one or another target elsewhere in the visual field. This is what I refer to as the circuit selection problem. But notice the way I'm framing the problem. It sounds tractable, to me anyway, when I put it this way, which brings us back to point 1.

Apart from the fact that Shadlen offers one of the most powerful and eloquent interpretation of a neural/behavioral dataset of this conference, I believe that he also brings an important distinction between two types of consciousness (i.e. Neuroscience-consciousness vs. Philosophy-consciousness) that seem to evade even some of the most prominent speakers of this school (namely Searle when he argued that he is conscious (Philosophy-conscious) because he can move his arm at will (Neurology-conscious)).
Abstract: The search for neuronal correlates of consciousness (NCC) often relies on comparisons between neuronal activation patterns associated with conscious and non-conscious processing, respectively, of physically identical stimuli. This strategy is known as the subtraction method and thought to isolate neuronal processes specific for conscious experience. However, this approach does not allow one to clearly separate the NCC proper from processes that just permit access to consciousness such as fluctuations in excitability at early stages or from processes that follow conscious experience such as storage of perceived items in working memory and response preparation. This problem can be reduced but not eliminated by considering the precise temporal sequence of events, using methods that capture brain activity with high temporal resolution such as time frequency analysis and event related potentials extracted from EEG or MEG signals.

Applying these methods we find as an early NCC a brief burst of oscillatory activity in the beta/gamma frequency range that occurs about 180 ms after stimulus presentation and is synchronized across a widely distributed network of cortical areas. This suggests as NCC not the activation of a particular, higher order cortical area but a dynamic state that is characterized by the coherent activation of a widely distributed network. This agrees with Baars and Dehaene's hypothesis of a workspace and also with Sherrington's view that the unity of conscious experience does not require convergence in space (anatomical convergence) but results from coherence in time (temporal convergence, phase coherence). Indications for a special role of precisely synchronized oscillatory responses in the high frequency range have been obtained previously in animal experiments, using the paradigm of binocular rivalry.

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www.ncbi.nlm.nih.gov/pmc/articles/PMC1692413/pdf/9854255.pdf


John Benjamins, B.V., Amsterdam 2010, 17-28


Comments invited

Posted by Stevan Harnd
We can add it to the list of phenomenon that a theory of consciousness should explain.

At the end of his talk, Singer mentioned consciousness without content, such as in people meditating. This is not something that has come up so far in the summer school.

What fun!

I did not expect a couple of decades ago to ever have this discussion, or to be getting within a few hundred ms of a plausible answer. getting close to that point, and it's great fun, also to be doing this in a widely distributed international network of scientists thinking in similar directions.

I know that a number of important people have made proposals along these lines, but we never quite believe it until we work out all the steps ourselves. I think I'm finally precisely the kind of "...dynamic state that is characterized by the coherent activation of a widely distributed network" that you suggest. Then at some point perhaps one finds a phase-change (Freeman), or a moment of ignition (Dehaene, et al), or a coherent activation of a widely distributed network.

One interesting possibility raised by the work of Dehaene, Gaillard, Revonsuo (and his coworkers) and others is that the "novelty P3b" involves a preconscious build-up of precisely this sort of a "...dynamic state that is characterized by the coherent activation of a widely distributed network" that you suggest. Then at some point perhaps one finds a phase-change (Freeman), or a moment of ignition (Dehaene, et al), or a coherent activation of a widely distributed network.

We should just surround the problem from all sides, and let the evidence speak!

One interesting possibility raised by the work of Dehaene, Gaillard, Revonsuo (and his coworkers) and others is that the "novelty P3b" involves a preconscious build-up of precisely this sort of a "...dynamic state that is characterized by the coherent activation of a widely distributed network" that you suggest. Then at some point perhaps one finds a phase-change (Freeman), or a moment of ignition (Dehaene, et al), or a coherent activation of a widely distributed network.

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Antti's VAN igniting from a P3b-gathering of preconscious recurrence is a little bit off your number of 180 ms. I have no idea which is right, or whether they are aspects of the same phenomenon.

I did not expect a couple of decades ago to ever have this discussion, or to be getting within a few hundred ms of a plausible answer.

What fun!

Best wishes,

Bernard

At the end of his talk, Singer mentioned consciousness without content, such as in people meditating. This is not something that has come up so far in the summer school. We can add it to the list of phenomenon that a theory of consciousness should explain.

This is indeed very interesting! Like you said it's a new element! I'm also very interested in the "degree of consciousness". I know that Mr. Hamad argue that you are either conscious or you are not (sorry for repeating that again!), but I wonder about evidence like the meditation you mentioned, or hypnosis that is supposed to put you in an hyper-conscious state (if I remember correctly), or even when you are sleeping and you hear something in your dream that wakes you up, you were sleeping so you weren't really conscious, but still you got conscious about this stimuli. So many ways to explore!!!

Good point. And to follow up on Marjorie's post: Shimon Edelman, who was borrowing from dynamic systems theory (and who was thus also fond of the idea that consciousness has to be understood as the result of the dynamics of an entire system over time), claimed explicitly that there are degrees of consciousness. So I am wondering: is the view that there are degrees of consciousness a direct corollary of a dynamics approach to consciousness?

I so much agree! I am also struck by how little is said at this conference simply concerning a description of how consciousness is actually experienced, i.e. what is the phenomenon that we seek to describe. A while back, looking back at how my own consciousness had evolved over my life time, it struck me that it had actually grown over the years to encompass a wider and wider realm. And I thought that perhaps that could be the reason for adults' anxiety, because our consciousness has grown to a level to encompass problems that we can't actually deal with, and whether that could be the reason that children are so happy, because they can still deal the realm of what they are conscious about, and whether that is not the reason that meditation (focusing on a much limited realm) does not appease us? Another thing to consider about the conscious experience, it seems to me, is its power to feedback upon specific mental processes, as in when we think of something and it makes us cry or laugh or decide to think of something else...

I'm with you on this point, and you make some excellent observations – especially coming from a non-cognitive science or philosophy perspective (although, yes, I have done my own investigations onto the definition of conscious experience), it is difficult to integrate all the possibilities falling under the realm of conscious experience. Even creating definitions, and even when focusing on humans alone, becomes as much a logistical nightmare as it is a semantic nightmare.

As well as serving to answer the 'nature vs nurture' question which has arisen periodically during this conference, examining the conscious experience of children serves to uncover incredible insights on how a fully actualized adult forms conscious experience. If not only becomes wider, it becomes richer and more influential as new semantic and episodic memories are incorporated. As our past experiences grow in magnitude across a lifetime, they seem to exert disproportionately more control over things as elemental as feelings.

I am kind of just rambling, but I suppose a point I could make is that as this body of conscious experience (and repertoire OF conscious experience) grows over
one's lifetime, all elements seem to be more intertwined. I can no longer feel elemental joy at a cute newborn due to the looming threat of global catastrophe caused by overpopulation (I don't actually think this, just making an extreme point :)). It becomes increasingly difficult to point to a neural correlate or cause of consciousness as a single defined loci, especially a single visual neuron making a binary choice. Coming back to Wolf's ideas, I think it makes more sense for consciousness to exist as a global state of small world networks, interconnected across time and space. Each mini network might represent specific features of the external, internal or episodic memory world— but alone insufficient to qualify as an NCC.

I also liked his thoughts/questions at the end of the talk about consciousness without content, as Martha mentioned. I was also very interested in his discussion of schizophrenic patients. Could they be considered to have different levels of consciousness? What about patients with personality disorders? I am wondering if it would be a good idea to look into different disorder populations in studying consciousness. Where would these fit in terms of evolutions of humans? So many models/talks have used animals and/or robots to study consciousness, it would seem interesting to also compare different types/levels of consciousness within humans.

The zero phase-lag in oscillations measured at distant cortical points... was explained by a common pacemaker, nonlinear interactions and/or something about having three points in space... how about good-old volume conduction? Also, I wondered what Dr. Singer thought about long-range inhibitory connections such as those identified between hippocampus and septum, do they also play a role in inter-region synchronization?

Do schizophrenics with positive symptoms (hallucinations) have too much integration of info, perhaps displaying increased gamma power and increased synchrony compared to normals?

I think it's important to establish how fMRI, EEG and MEG signals correlate with each other. I was happy to hear Dr. Singer say that increased gamma power in MEG correlated well with fMRI signal. Generally, this will be difficult to do, possibly because it may require applying two techniques in the same study if not simultaneously. But I think it would be important if we are to have a unified idea about what is happening in the brain when given a certain cognitive task, since we see more and more that experimental conditions make a huge difference to brain activity.

Very interesting idea! I am not sure I understand well, but could this be related to the fact that after all consciousness is about putting different kinds of information together? Hmm... Further, synchrony in time, could it be a general feature of biological systems, and explain why biological systems are so robust to perturbation (of specific points in space)?

Synchrony brings cells' activity in distant networks to fluctuate together, so it's thought to be involved in binding of information processing. Consciousness is also a unified percept across modalities. But I am not sure about equating consciousness with synchrony, just because they appear to do similar things.

As for a cell being part of synchronized rhythmic activity, that's actually a different question because cell assemblies and rhythmic activities are somewhat dissociable but related. For example, you can get rid of the theta rhythm but you may still have cell assemblies. But, the information contained by these cell assemblies is degraded because they cannot fire together as effectively without the rhythm. Many cells are synchronized by the same rhythm because they are driven by the same pacemaker (other mechanisms of synchrony exist of course). The pacemaker input can come from a local synaptic network or from a subcortical structure that provides a rhythmic input. I guess you may be left out of the rhythm if you don't receive such an input, thus the membership/exclusion is dictated by synaptic circuitry. (A bit like if you don't belong to the same facebook group, you won't know where everyone's going out for drinks after the conference :) And we have certain key people - the pacemakers - that disseminate this knowledge.)

I think your idea bout conscious perception and what constitutes the contents of it by looking at which regions are synchronizing together is feasible. I'm probably going to do my paper on this subject!
A quite general question popped-up in my head when Wolf Singer presented briefly the two hypotheses commonly found in neurosciences about the neurobiological structures underlying consciousness, mainly that consciousness might be either produced and controlled (1) in some specific parts of the brain; or (2) in the whole brain. However, I was wondering whether it might not be a mistake to see consciousness as a "thing" with neural correlates (such as the visual pathway, the auditory pathway, underlying structures of memory, etc...) that is produced and controlled by some specific structures (as suggested by the first hypothesis) rather than seeing consciousness as a general neural state that is the consequence of the combination of all our cognitive abilities interacting together (those cognitive abilities having themselves their own underlying structures), which would lead to say that consciousness doesn't really have a proper neural circuitry?

OSCILLATORY NEURONAL SYNCHRONY AS A SIGNATURE OF NEURALLY-BASED CONSCIOUSNESS
Dr. Singer sustains that the neural correlate of the global workspace of consciousness may lie in the oscillatory synchrony between neurons across the brain. If so, then maybe we could design a test for the presence of consciousness in animals based on the presence of such global oscillatory synchrony in the brain. For example, if no such global synchrony phenomena occur in aplysia, then we could conclude that the aplysia nervous system does not generate conscious experience. Of course, this test would need to pass many tests before considering its validity.

Signer: correlation between "synchronized" oscillating neurones is at best 0.3, and he just called 0.25 a "strong" correlation...

In Dr. Singer's talk he highlighted the dynamic state that is characterized by coherent activation of different networks. He mentioned schizophrenic patients as having a reduced gamma synchrony as compared to control patients. I have read that people with autism also have a reduction in high frequency oscillations, which I assume is also associated with a reduction in oscillatory synchrony. I am curious if in this population this would be attributed to a a confusion or misinterpretation of stimuli similar to that in schizophrenic patients.

Erik Cook: Are Neural Fluctuations in Cortex Causally Linked to Visual Perception?

Abstract: Our perception fluctuates when we view images at the threshold of our visual capabilities. It has been widely shown that fluctuations in visual cortical activity are correlated with fluctuations in perception. The source of these neural fluctuations, however, is not clear. Are they causal, such as bottom-up sensory noise, that directly influences perception? Or are these fluctuations non-causal, such as top-down attentional modulation, that produce correlations between sensory neural activity and perception when no functional link actually exists between the two? In this presentation, I will present accumulating evidence that both causal and non-causal processes are responsible for this functional link and that careful electrophysiological observations can distinguish between these two sources of neural fluctuations.


Comments invited

Posted by Stevan Harnad

16 comments:

Shady Rahayel 5 July 2012 07:24
I was just wondering to what extent we can really extend the findings obtained in monkeys and rats to human beings. We talked earlier that debate if it's about consciousness being there or not, or if the interest is rather to understand consciousness as a continuum. A. Cook's presentation is interesting, but I'm just thinking about how would the findings presented be applicable to human beings as well. When we see a bunch of dots moving to our right, how many things else are getting activated at the same time in our head and that influence the "consciousness", the "perception", of it all? I'm just having a moment of worry about the ecological validity of all these studies on consciousness. Of course I understand that we have to isolate variables, this is science after all.

Erik Cook 8 July 2012 08:45
Shady - your musings are well founded and justified. All this would be better studied in humans if we had brain imaging methods with much better spatial and temporal resolution. Then we could go right to the source. I expect these brain imaging technologies will come along eventually, but it may be a while. In the meantime, animal-based studies provide us a glimpse of how consciousness in humans may be approached and understood.

Claudia Polevoy 5 July 2012 07:57
I agree, and I think that was the concern of many people during the question session. We saw so many animal studies during this summer school, but how many can really be interpreted according to the human consciousness? Perhaps we should first look at meta analysis and literature review. Obviously there are some advantages to
animal study, as the single neurons recording, but where that lead us? I believe that consciousness is still such an abstract subject, we feel the need to study several research paradigms in different fields of study (philosophy, anthropology, neuropsychology, neurology, etc.) and animal experiments is one of it.

Claudia Polevoy  - UQAM

Erik Cook  8 July 2012 08:57
Claudia - So you and others are asking "why study the neural mechanisms of consciousness in animals?" We all agree it would be better to study this in humans if we could only record human brain activity with sufficient resolution. For example, the temporal response of fMRI BOLD signals is 10X too slow compared to what we think are the time-scale of neural signals associated with consciousness. There is still a lot of work to do while we are waiting for advanced human brain imaging technologies to come along - which includes defining the variables that we believe are associated with consciousness.

Martha Shiel  5 July 2012 17:37
Claudia and Shady, you are making an assumption that human consciousness is dramatically different from consciousness in other animals. It might be, but the differences could also be relatively small (as a metaphor, there are differences in the visual sensory systems of mammals but there are still large similarities). We can hash out the details of the differences once we have generated some data-based theories.

Claudia Polevoy    - UQAM

Marjorie Morin  5 July 2012 17:58
I agree. I guess for now it's just finding what is consciousness: how, what and why. I guess the answer to these questions should be the same for all organisms. Yes of course, our consciousness might be different due to our language for example, but Mr. Harnad keep telling us that it's not a matter of degree: you are conscious or you're not. Then I guess for now animals can give us a lot of informations about these questions. When we will know more it should be interesting to see the differences between animals' and humans' consciousness.

Erik Cook  8 July 2012 09:08
Martha & Marjorie - I'm with you in that consciousness is probably a matter of degrees until we can prove otherwise.

Carey YL Huh  5 July 2012 19:03
I think Dr. Cook's approach of looking at both single cell activity as well as population activity (EEG or LFP or at least multiunit) is important, not just because we get more info that way but also the population activity has a bearing on the single cell activity. In the case of oscillatory activity measurable using LFP, it can modulate the cell's firing timing as we saw with phase locking which can have its own meaning, as seen in Dr. Singer's talk.

Erik Cook  8 July 2012 09:08
Carey - I agree that the more independent measurements the better. However, the key word is independent. For example, if gamma band LFPs are correlated with neural spiking, then it does not add much to our understanding.

Carey YL Huh  9 July 2012 21:09
Dr. Cook, I completely agree. I have always been skeptical of gamma band LFPs because they could potentially just be poorly isolated spikes! And indeed they appear to co-occur very often.

And what I still do not get is, how does gamma oscillation synchronize across brain regions, even distant ones? If you see synchrony pop up in EEG/MEG, how synchronized is it really in terms of exact timings? I consider gamma rhythms as something that arises from more local networks, because higher-frequency oscillations/signals do not propagate over large distances well. I wonder if gamma synchrony is just a by-product of the faster-oscillations riding on slower-oscillations that are truly synchronized across distant regions (due to common pacemaker)? Any help to clarify this matter will be greatly appreciated!

Erik Cook  14 July 2012 09:35
The how and why of synchrony in the gamma frequency band is an ongoing point of study in systems neuroscience. At this point, I don't think my opinion would contribute much on this subject. What we need are good experiments that measure the behavioral effects of modulating gamma synchrony with no modulation to other measurements of neural activity!

Sebastien Tremblay  29 July 2012 19:34
Thanks to Dr Cook knowledge of statistics for reminding us that if we want to study the neural correlates of consciousness, we need variability. What is it then that you vary in order to correlate neural consciousness with another variable? That's an important question.

First, we would need to agree on if consciousness can be mapped on a continuum. Although it seems to be the case for neurological scales of consciousness (awareness ... confusion ... coma...), it doubt there is such a consensus on the case of the phenomenological consciousness (feeling) we are referring to in this conference.

Alexandre Duval  31 July 2012 11:30
I am not sure you need to say that consciousness is a matter of degree. What you can say, rather, is that it is a matter of degree whether or not a certain stimulus is perceived (or maybe `felt') as moving in a certain direction. Take, for example, the experiment with the two random-dot patches designed by Dr. Cook. It might be that the monkeys' feeling that there is motion in one direction or another is a matter of degree. The perceptual states themselves are fully conscious, but it is the content of these states that can vary on a continuum.

Nico Sheppard-Jones  31 July 2012 20:36
I agree with Alexandre's comment. I recall that after the talk, I thought for a second that the Gamma-Beta temporal interactions described by Dr. Cook might be compatible with the all-or-none consciousness approach (where one is either conscious or not, and, as Alexandre said, it is only the content of consciousness that varies on a continuum).
Bjorn Brembs Behavioral Freedom and Decision-Making in Flies: Evolutionary precursor of "Free Will"?

**Abstract:** The collaborative actions of chance and necessity make up the foundation of evolutionary success: the deterministic rules of selection act upon the stochastic genetic variation to bring about adaptive change. Genetics studies both the variability of genomes and the almost faithful transmission of genetic information from generation to generation. The same concerted action of chance and necessity underlies bacterial chemotaxis: Escherichia coli uses straight runs and random tumbles to orient in odor plumes. In both instances, we understand both the mechanisms underlying the generation of variability and those of the deterministic components. The behavior of organisms with nervous systems also employs this powerful combination when at first different behaviors are tried out in a new situation until the desired goal is achieved. Subsequent encounters with the same situation then lead to the successful behavior increasingly quickly. While we understand the deterministic selection processes (reinforcement) leading to the reliable production of the behavior comparatively well, we know next to nothing about how the behavioral variability is generated that provides the substrate for these selection processes to act upon. Mutation, sexual recombination, jumping genes or horizontal gene transfer are crucial not only for evolution to take place, these fundamentally stochastic processes also make evolution principally unpredictable. Analogously, the processes by which brains generate variable and sometimes genuinely new behaviors are crucial for brains to generate adaptive behavioral choice and make brains principally unpredictable. It is this unpredictability which forms the evolutionary basis for behavioral freedom, a candidate for the evolutionary precursor to what we today call 'free will' in humans.

Brembs 2010 Towards a scientific concept of free will as a biological trait: spontaneous actions and decision-making in invertebrates. Proc Roy Soc B http://rspb.royalsocietypublishing.org/content/early/2010/12/14/rspb.2010.2325
Grobstein, Variability in Brain Function and Behavior http://serendip.brynmawr.edu/ibb/EncyHumBehav.html
Miller, Protean Primates: The Evolution of Adaptive Unpredictability in Competition and Courtship http://www.unm.edu/~psych/faculty/articles/miller%201997%20protean.DOC
http://dx.doi.org/10.1038/4591052c

Comments invited

51 comments:

**Stevan Harnad** 5 July 2012 08:25
Distinguish (1) the question of determinism (is everything that happens just part of the cause-effect chain determined by the Big-Bang) vs indeterminism (quantum mechanics); from (2) the question of unpredictability (as in statistical mechanics), from (3) the question of voluntary action and choice (when I do something because I feel like it, was my feeling really a cause?).

**Philippe Vincent-Lamarre** 5 July 2012 08:51
But is there a cause to non linear behavior? Wouldn't it be a determined stochastic behavior?

**Romain Vincent** 5 July 2012 08:53
It seems clear that flies do choices, but can we relate these choices to intentions? How can we link choices to intentions in general?

**Laurie-Anne Dion** 5 July 2012 09:35
Choice and intention are closely linked. I believe that when there is a choice, there is an intention (the intention would be 'what you want to do' and choices will help you reach your goal). I don't know if flies do choices, they certainly react to operant conditioning.

**Laurence Dumont** 5 July 2012 11:34
without access to their subjective experience, I don't think we can say they have an intention.

**Adele Tufford** 6 July 2012 12:52
However, I think it is reasonable to say that a fly intends to avoid the noxious stimuli
In this basic form, you would make intention and conditioning equivalent. Given this, a fly (or any organism, biological or not) that avoids noxious stimuli would have intentions.

Izabo Deschenes 31 July 2012 21:23
I agree with Laurence Dumont. Also, if a robot avoids a stimulus, would we that this robot intended to avoid it? Probably not, it seems detecting and reacting to certain stimuli do not require ‘feeling’, simply ‘doing’. Does the fact that it is a noxious stimulus change things?

I assume the stochastic behaviour was taken to be the trademark of free will, but it’s not clear to me that that should be the case. Either linear or non-linear behaviour could be interpreted as ‘free will’.

It is not clear to me what the relation between stochastic behavior and free will is. Free will is not a capacity to act randomly in certain circumstances. If your actions and intentions (in certain circumstances) are determined solely by something like a random number generator, then you really are not in control of what your doing. You’re not choosing anything. Free will must involve minimally the capacity to respond to your own desires and your beliefs.

That is correct, stochasticity alone doesn’t do it: mutation without selection isn’t evolution. Stochastic processes without deterministic processes to make us of them, do not constitute behavioral freedom.

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Eric Muszynski 5 July 2012 08:58
I assume the stochastic behaviour was taken to be the trademark of free will, but it’s not clear to me that that should be the case. Either linear or non-linear behaviour could be interpreted as ‘free will’.

More importantly, both could also be argued to be no demonstration of free will at all. A toss of the dice is random but there is nothing to do with free will; reflex action is determined but there is no free will either.

@Muszynski: Indeed, random alone is not free, deterministic alone is also not free. But a system that contains both can be free. That’s the main point I tried to get across: if you only look at one, freedom goes away. Without selection, evolution doesn’t happen, without mutation, evolution doesn’t happen. You need both or the phenomenon disappears.

I’m having trouble understanding how a system that contains both linear and non-linear behaviours suggests freedom more than a purely linear system or a purely non-linear system.

You also mentioned criticality, which seems to imply that the linear and non-linear components need to have a special relationship to suggest freedom of the system. Could you elaborate on criticality and what you think it implies?

1) Nonlinear systems have the weird property of being able to produce, under certain parameter conditions, linear output (despite the fact that the system generating the output works according to nonlinear rules). This needs to be understood as separate from adding stochasticity to such systems.

2) Here comes an even more weird property: if you tune nonlinear systems to be mathematically unstable (i.e., such that we would see an increasing curve in the S-MAP procedure) these systems can become indeterminate even though the nonlinear rules of the system are completely deterministic. In the 1980s this is what people called deterministic chaos.

3) So far, everything above can be generated exclusively with deterministic components, that’s fascinating in and of itself. However, when you add stochastic components to the system (such as noise), it becomes principally indeterminate, as the nonlinearities in the system can amplify the low-level noise that is present in the system.

It sounds to me that the first part of your comment was getting to my point 3), while the second part was geared towards 1) and 2).

If you have a nonlinear system with noise, and it is mathematically unstable, then you have highly variable output where the presence of noise is important, but how much noise you have is fairly irrelevant. If you have nonlinear system that is mathematically stable, than its output is less variable and this variability dependent on the amount of noise in the system. In the first case, the S-MAP curve would be inclining, in the second case not, even though the variability may potentially seem similar to the human eye.

Criticality refers to systems that are hovering exactly at the edge of being mathematically unstable and can thus combine properties of both being able to generate large amounts of variability and to also clamp it down and there are only small changes to the system required to transition between these two states.

So far, we have almost zero evidence that this is what happens in fly brains. The fly data are compatible with this idea, but so are probably a million other explanations. We are currently working on getting at the biology of these processes to make sure.

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If x does not follow a pattern and is not random, it does not follow that x is not deterministic. The constant pi is not predictable and non-random, that does not mean that a little guy is sitting in the platonian sky, making up pi decimals.

Lists of encrypted passwords will also reveal a non-random element of you look hard (what hackers and web coders call the "salt") but the translation of the clear-text password into the encrypted form is still done using entirely deterministic processes.
Andreas Kalckert 5 July 2012 09:21
I think that there is something very important to that observation that behavior occurs outside the stimulus-response box. Be it as a result of non-linear behavior or free will or whatever. Those behaviors lead to new input, it helps to explore the world around us and we do not just sit there and wait till some trigger comes along to provoke a pre-formulated behavior. To interpret this as a pre-cursor of free will is really challenging, but i like it a lot. Also, that difference between world vs self learning is really interesting and i would like to talk to you Björn about it a bit more. I see some links to the question i have... ;)

Emma Cusumano 5 July 2011 11:21
Similarly intrigued by world/self learning!

Björn Brembs mentioned yesterday that he has a hunch that learning to control external objects (i.e. world-learning) and learning to control our own behaviour (i.e. self-learning) probably develop in that order: first we learn about the world and then we extrapolate to ourselves. I wonder if the rutabaga-type AC appears earlier in development than PKC?

Andreas Kalckert 5 July 2012 12:06
My bets go the other way around. ;) first self and the body p, then external. But still i assume that agency could be devided into different agency types: external vs internal, something i missed in several works of Haggard's lab. But would appreciate any discussion on that, if you like... ;)

Björn Brembs 5 July 2012 12:22
Check out this paper:
http://www.nature.com/nature/journal/v456/n7220/full/nature07590.html
(Open Access)
The authors claim (and I'm not competent to comment on that) that their model is the best to model the nervous system of the Urbilaterian. As you can tell from the paper, their organization is behavior first, then evaluation of the outcome: the animals first move randomly and as soon as light comes, it inhibits ongoing behavior such that they move towards the light.

Thus, in the light of this paper, I'd hypothesize that self-learning is evolutionarily older than world-learning.

The order is reversed, though, if you ask what happens first during the experiment in an animal like our flies: there, what you see is that during the experiment, world-learning is quick and actually slows down self-learning such that we can detect world-learning coming on after already 4 minutes, whereas this experiment has to go on for 12 more minutes before we can detect self-learning. I had to cut these results out for time reasons.

Björn Brembs 5 July 2012 09:22
Indeed - which is why it is crucial that we found a nonlinear signature, because we know that nonlinear systems which work according to fully deterministic rules (i.e., no explicitly stochastic components) still behave indeterministically (e.g. multi-body problems). Real-world nonlinear systems (i.e. those that incorporate explicitly stochastic components) are principally indeterminate.

Björn Brembs 5 July 2012 09:24
I'm available until I have to leave for my flight tonight, which departs at 11pm.

Ana Pesquita 5 July 2012 09:34
I am intrigued by fly “personality”. In particular, the fact that after reliably learning about the world (e.g. turn right = heat) the flies once in a while would turn right as if to test their learned assumptions of the world. Is it possible to predict this behaviour in flies? For example, the rate of learning about the world (right = heat) is a predictor of the later behaviour of testing the constancy of the world ( right ? heat )?

Björn Brembs 5 July 2012 09:40
Excellent question and empirically answerable. We haven't done that and my subjective impression is that you will find different classes of individuals in which you will find all possible correlations. We have the data if you want to have a look :-)

Ana Pesquita 5 July 2012 13:16
Neat! I will try to catch you before you leave.

Vincent LeBlanc 5 July 2012 11:43
As a philosopher I think it might be useful to recall that freedom of will and freedom of action are two interdependent, but separate issues. If I am (physically) free to go left OR right I have (some degree of) freedom of action. However, this does entail I also have freedom of will. If the outcome of my choices (willings) is determined or partially constrained by external manipulation or chance - rather than stemming from my self made intention to act - I am not the ultimate source of my choices and thus I have not free will. For example, robots have freedom of action (say, move right or left), but lack genuine freedom of will (since we have programmed them to do something, and THAT is what will determine their choices - even just by increasing the probability of one over the other).

Control over alternatives seems thus fundamental to attribute free will to someone. It is within this “garden of forking path” model of control that we can say: we have free will if we might have chosen otherwise (rather than DO otherwise - since that is freedom of action).

This is just a side note, but I think it is important to keep in mind in order to avoid misinterpreting the definitions Björn gave at the beginning of his very interesting talk.

Björn Brembs 5 July 2012 12:51
"If the outcome of my choices (willings) is determined or partially constrained by external manipulation"
Non-deterministic, in philosophy, means that it is not (or not entirely) caused by external forces. It is not the same thing as a non-deterministic process in the sense of free will.

Björn seems to consider the ability to generate behavior as free-will. Fair enough, but that's just not the definition we usually use, and is confusing because that kind of free will is not actually free. Being able to select from different behavioral strategies or, like Dennett wrote to let "our hypotheses to die in our stead" is not a demonstration of free will.

Ah, thanks for clarifying that (somewhat, lol). I think the data we have suggest that flies REALLY could chose otherwise (i.e., the sum of all extrinsic causes is not sufficient to explain/predict the choice), but until we know how the neurons are doing it, we cannot have a very high level of certainty.

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Vincent LeBlanc 5 July 2012 17:49
1) BB:"I don't have wings, so I may will to fly as much as possible, this will is constrained by the external manipulation of not having wings." My reply: In this case, I would say you are the ultimate source of your willing to fly (hence you DO have free will), but your freedom of action is constrained by your physical constitution, i.e., not having wings (hence you DO NOT have freedom of action).

2) There are compatibilist arguments arguing that free will is compatable with determinism. So it is not necessary that freedom of will is constrained by determinism.

3) I agree with you that a notion of absolute, unconstrained freedom is ill conceived (at least for your purposes). Freedom of action is basically constrained by the physical laws of nature (gravity, and so on), and freedom of will is similarly constrained: physically (by our limited cognitive capacities), and psychologically (we are influenced in decision-making by a multitude of social, cultural, environmental, and other factors).

The point I wanted to make was that freedom of will needs that whatever willing one has, she is the ultimate source (she is in voluntary control) of that willing (i.e., she REALLY could have chosen otherwise). I don't see how we can pretend to understand "how much" free will one has, since I don't see how we could understand whether it is the ultimate source of its choices.

Maxwell J. Ramstead 14 July 2012 11:51
I am intrigued by the notion that our sense of free will could stem from the chaotic behavior in neuronal systems, and the special mathematical features of non-linear systems. I can’t help the feeling that there is something fundamentally right about this intuition: freedom only makes sense within a framework of constraints. However, it seems to necessarily lead to the idea that philosophical free will, as mental causation, is radically inadequate. Indeed, if neuronal decision making and criticality is all there is to human volition, then the processes that engage action are purely physical; therefore, mental events would have to be "effects" of physical processes, and never causes. This is a massive headache for anyone who has dabbled in Action Theory, but it seems to be correct.

BB: "replacing 'mental' with 'brain processes' your problem dissolves"

Wish it were that simple. Besides, the problem is not mental vs. physical but felt vs. done. And replacing "felt" by "brain processes" doesn't tell you how or why organisms feel rather than just do.

Carey YL Huh 5 July 2012 17:46
I am fascinated by Dr. Brembs' and others' findings that dysfunctions in specific synaptic-plasticity molecules which are expressed brain-wide presumably can lead to deficits in very particular types of learning like language/song acquisition and self/world learning. I want to commend Dr. Brembs for showing us what flies can be trained to do and for illustrating how behaviour-genetics-neuroscience can all be studied in the same experimetal framework!

I commend Brembs on committing to an operational definition of free-will. It might not be consistent with our views of free will, but it at least gives us a starting place to explore from.

Guillaume Loignon 5 July 2012 19:59
Bjorn seems to consider the ability to generate behavior as free-will. Fair enough, but that's just not the definition we usually use, and is confusing because that kind of free will is not actually free. Being able to select from different behavioral strategies or, like Dennett wrote to let "our hypotheses to die in our stead" is not a demonstration of free will.
"non-random" process. There are many processes that are non-random but still determined, actually, random is not much than a shortcut for "cause unknown".

Like Stevan wrote in the first comment, the fact that an action was "willed" does not mean that it is not determined in the hard sense, just that it was caused by internal processes of the agent. BUT, and that's an important but, those processes are themselves caused.

A-causal decisions would not make any sense in the real world since they would be completely arbitrary and thus as useless as random decisions.

**Björn Brembs** 6 July 2012 09:44

So flies are 'free' but not 'actually free'? What is the difference between 'actually free' and 'free'? We are our brain. If the (neuronal) causes for our actions are in our brain, we are agents and if these actions are not fully determined we are free. That degree of freedom might not be satisfying to everyone - tough luck, dualism isn't an option, we have to live with the cards we are dealt. For me personally, the fact that 'free will' can be provided by an entirely materialistic brain is cause to celebrate, not to resign. Brains are creative, unpredictable and chaotic while at the same time able to allow us to survive in a Newtonian macrocosm. What else could we possibly want? Our brains provide us with every possible trait necessary for very action from genocide to artistic masterpieces and science. Our brains manage to do this without the need for magic and allowing us to consciously experience all this to boot. What could possibly be missing from that account?

Unless I misunderstand you, the requirement of 'actual freedom' sounds to me like a wish for superpowers. There are comics for that. In reality, we already have a brain that works in such intricate ways that we have trouble letting go of magic in order to explain it.

**Adele Tufford** 6 July 2012 13:02

By characterizing brain activity as creative, unpredictable and chaotic, I think you are buying in to some of the magic ;)

I think the brain (and it's functions) is unbelivably organized and predictable - we are just not yet intelligent enough to be able to predict it

**Björn Brembs** 7 July 2012 01:43

Your last sentence contradicts the data, as it suggests indeterminate systems controlling behavior. If we were able to predict fly behavior fully, then this would be akin to a comeback of determinists that physicists have tried and failed for 80 years.

Like I said in the talk, determinism is like a religion: plenty of people believe in it, despite all the evidence to the contrary...

**Pauline Claude** 5 July 2012 20:05

As Björn Brembs pointed out nicely, all brainy organisms have inputs, those inputs are generated by the brain and it results in outputs as we call behavior meaning that all kind of behavior is a stimulus-response. In other words, behavior needs a stimulus to occur, which makes great sense since behavior can be seen as the result of brain activity only and that this activity has to be triggered at some point by a starting stimulus.

He also pointed out that in an ambiguous situation organisms had to make a decision to reach their "species-related goals" coping with the stimuli present in the environment. However, my first question/comment is the following:

Does it really exist a "behavioral freedom" when you have to behave to fulfill your primary basic needs for survival and reproduction? Because, I can explain that in more details if needed in another comment but, behavior only serves organisms to ensure survival and reproduction (and according to the psychobiological approach of behavior, even any human behavior would have evolved because at some point, it serves survival and/or reproduction). So even if you "make decision" to behave, this behavior will always be motivated by a aaim to increase the probability to maximise survival and reproduction. Considering that, is there really a "freedom" in our behavior or, do we always "decide" to behave according to the best estimation of our brain to increase our fitness?

My second question/comment is about the first experiment with the flies in a completely stimulus-free environment (free of ambiguous situations).

All the following is mere guessing but... Even in that stimulus-free environment, is that really a completely free stimulus-free environment? Because in this experiment, only external stimuli are taken into account. But what about internal stimuli? because as long as an organism is alive, brain needs to be active. To be active neurons in the brain need to be activated, but to be activated, neurons need a starting stimulus. Evolution works to create adaptive behavioral patterns that has to be encoded somewhere in the genes. So even in the absence of stimuli, an organism has to have a behavioral strategy to cope with an ambiguous-stimulus-free environment. In the absence of external stimuli, organism has thus to produce internal stimuli to guide their behavior. In other words, developing a stereotypic behavior in the absence of stimuli would itself be adaptive because in that kind of situation you always need to find strategies that will lead you to fulfill your needs for survival and reproduction. Memory might have a really important role in that process.

To summarize, I think behavior in the absence of stimuli is never mere randomness, not to say it has nothing to do with randomness. On the contrary, behavioral strategies involved in decision making has to be somehow encoded and guided by memory contents.

**Björn Brembs** 6 July 2012 09:57

Actually, I said the opposite: all brains are action-outcome evaluation, not stimulus-response. Stimulus response is a highly derived trait and mainly a laboratory artifact.

The question about fitness is excellent and tricky, because you ask about ultimate and not proximate causations (that's a distinction in biology you can lookup if you're not familiar with the nomenclature).

Indeed, increasing your own fitness is a main driver for your behavior, which is precisely why we try to make the situation as artificial as possible. In such a situation, the general situation may elicit some general strategy, but that strategy doesn't explain at what specific timepoint neurons should fire to make the fly go 'left' or 'right'.

For example, the strategy "I have to get out of here" doesn't explain why the animal is flying straight now, left a millisecond later and hundred milliseconds later makes a right turn: during all of those behaviors, the strategy remained the same.

Thanks for bringing this up, I think this was a very important aspect that I didn't have time to go into.

**Björn Brembs** 6 July 2012 10:02

What is an 'internal stimulus' and how does it make the fly go left at one time point and right at the next?

BTW, the behavior we see in the flies are precisely the opposite of 'stereotypical', they're highly variable and you are right, they are not 'mere randomness': they are in-between 'stereotypical' and 'mere randomness', that was the most important part of my talk. Just like evolution or bacterial phototaxis isn't 'stereotypical' or 'random', spontaneous behavior always contains both components.

**Sarah Etezadi** 6 July 2012 10:41

I have been pondering a similar question about the "stimulus-free" nature of the fly’s "sensory deprivation tank" (as one of the morning's commentators put it). The fly is literally glued to an apparatus that is preventing it from flying away. It is, however, awake and free to flip its wings, move its antennae and a host of other things. Thus it appears to me that the purported "spontaneous" behaviour consisting of repeated attempts to fly to the right and left is likely to be escape behaviour. This fits well with what Pauline was saying about behaving to maximize fitness - in this context we can probably say that all animals are "programmed" to seek freedom of movement in order to best search for food, a mate, etc. Thus the "random" left and right movements are expressions of this programming. And thank you Björn for
pointing out that there is nevertheless a certain freedom within the programmed strategy with respect to the choice of direction at any given moment in time (as a homo sapien who has evolved via natural selection may I just say: whew, what a relief!) In terms of stimuli, I also don't know what a purely internal stimulus would consist of in a fly, since I can't imagine it ruminating over its memories or anything like that. But I do suspect that the fly is receiving some sort of stimuli from its sensory system indicating to it that it's attempts to fly away are in fact failing, and that these signals may in fact be the cause of it's repeated attempts to move left and right. This still doesn't explain why it "chooses" left or right in the way that it does, but it does make the claim that the fly is acting in the "absence of any stimuli" seem like somewhat of an overstatement.

Pauline Claude 6 July 2012 15:59
What Sarah pointed out is quite similar to what I reply on Facebook to Bjorn. Here is my reply:

Thanks everyone for all these comments.

But I keep thinking that randomness might be, exactly as I think free will is, mainly a mere illusion. Because I can't see how we can have a non-dualistic way of thinking and include some sort of randomness? it has to have something that triggers the action. Neuron firing may appear random at some point (and I insist on the word "appear") but how do you explain the apparition of the stimulus that fires it in the brain?

However I totally agree on a certain kind of randomness in terms of probability in the sense that in the absence of relevant stimuli, it is quite adaptive to distribute equally the probability of developing a certain behavior rather than another (which seems to me to be merely the basis of trial-error mechanisms which is the most efficient way of learning how to react in physiological time to the environment!), but I think this "randomness" of the behavior is itself encoded in the genes as what seems to me to be an adaptation and that the first random behavior (such as turn left or right) that will be produced may at least have a probability of occurring slightly higher considering the effect on the organism in terms of benefits of all the stimuli the brain recorded until the moment the behavior is made. I mean that the brain might do its own probability of a certain behavior to be effective and always choose that with the highest probability of improving the fitness.

In addition, that might be questionable but I think that as long as the organism already have a "program" encoded in its genes to produce the "randomness" of the behavior, this randomness looses its intrinsic "randomnessibility"...

Bjorn Brembs 7 July 2012 01:56
Clearly, in intact animals, complete absence of stimuli is impossible. The important thing is that nothing in the environment is triggering each behavior as the stimulus situation is constant.

Perhaps more convincingly, one finds similar spontaneous behavior even in isolated nervous systems, see here for an example video from leech (but I've worked in isolated Aplysia ganglia as well):
http://www.youtube.com/watch?v=DmH3NxnLwVM

Clearly, there are no sensory organs left, any "internal stimulus" is generated by the neurons in the dish, which would mean the term 'stimulus' refers to anything that goes on in neurons and then this term would be rather useless.

If you think randomness is an illusion you give the impression of a member of the determinist religion: many adherents, no evidence.

In general, it's important to distinguish between randomness/stochasticity and the random-like behavior we have been measuring. Randomness is just a component that interacts with deterministic, nonlinear neuronal circuits to accomplish random-like behavior. That distinction is critical for understanding the behavior I described.

Pauline Claude 16 July 2012 08:07
COMMENTS COPIED AND PASTED FROM THE CORRESPONDING POST ON FACEBOOK:

ANDY NDX :
"It is still some sort of randomness I think, but as he pointed out not complete randomness in mathematical terms, but randomness set up by a nervous system, where we will be able to find some sort of principals. And I agree: also in that stimulus-free environment the animal seeks to fulfill its biological needs and try to "survive". But the quasi-random behavior helps here: it hopefully leads to new stimuli, hopefully stimuli relevant to the survival. And I think that was the principal idea of Bjorn's talk: that possibility to quasi-random behavior should be implemented in the animals nervous system, this will increase hopefully fitness. And to take this even a bit further: this could maybe an explanation why humans are very successful evolutionary speaking as we might exhibit the biggest potential for quasi-random, stimulus-independent behavior. Therefore his idea that this trait could be precursor of what we call free will is very tempting and I assume provocative to most people."

MICHAEL SHALDEN :
"Randomness exists in behavior, owing to noise, but it does not buy much. For ethics, free will, responsibility. "Chance is as relentless as necessity" (Simon Blackburn). I think the neurobiology of decision-making does help ground an argument about moral responsibility at least and maybe FW too. It helps to focus not on the low level neuronal events or the noise but on the policies that the brain applies. A good example of a policy is the tradeoff between speed and accuracy. I like this example because we know something about the neural mechanisms (I told you about this in my lecture) because it mediates the type of distinction we care about when we hold someone ethically responsible for a good or bad decision. If you want to read more, check out [http://www.ncbi.nlm.nih.gov/pmc/articles/PMC3332233/]

BJORN BREMBS :
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Indeed, increasing your own fitness is a main driver for your behavior, which is precisely why we try to make the situation as artificial as possible. In such a situation, the general situation may elicit some general strategy, but that strategy doesn't explain at what specific timepoint neurons should fire to make the fly go 'left' or 'right'.

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Pauline Claude 16 July 2012 08:08
Pauline Claude

*Thanks everyone for all theses comments.

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Julio Martinez  : Voluntary Attention and Working Memory in The Primate Brain: Recording from Single Cells

**Abstract:** Neurons in the dorsolateral prefrontal cortex (dPFC) of primates respond to visual stimuli and are selective for attributes such as location, object identity and motion direction (Zakas and Pasternak, 2006). Furthermore, this selectivity persists when stimuli are removed and their attributes maintained in working memory. Previous studies have suggested that some dPFC neurons preferentially represent the current sensory input, while others represent the contents of working memory (Fuster, 2000; Pasternak and Greenle, 2005). To investigate this issue we recorded the spiking activity of 155 dPFC neurons from two rhesus monkeys while they performed different tasks in which they compared the motion direction of a sample random-dot pattern to that of a subsequent test pattern. In the Memory task, the sample and test presentations were separated by a delay period during which the monkey was required to remember the sample direction. In the No-memory task, the sample remained present during the entire trial, thus eliminating the working memory requirement. For each of the two tasks, the ability of each neuron to represent the motion direction of the sample during the delay period was quantified using signal detection theory. In approximately half of the direction-selective neurons, representations were stronger when the sample remained present (No-memory task) than when it was remembered.

Julio Martinez  : Voluntary Attention and Working Memory in The Primate Brain: Recording from Single Cells

**video**
(Memory task). Interestingly, in the remaining neurons, the sample direction was more strongly encoded when it was remembered than when it remained perceptually available. This suggests that while the former neurons preferentially encode sensory input, the latter may serve a specific role in working memory maintenance. The ability of the entire population of recorded neurons to represent the sample direction was quantified using a linear discriminant analysis. In both tasks classification performance remained well above chance throughout the entire delay period. These results demonstrate that in the dIPFC the strength of visual representations during working memory is temporally robust and comparable to that of representations driven by sensory input.


Comments invited

13 comments:

Nico Sheppard-Jones  5 July 2012 13:57
Dr. Martinez mentioned that, partly for ethical reasons, macaques used for single-cell recordings are Rhesus, and not Chimpanzees. I thought that comment, even if done in passing, was directly relevant to some of the broad questions we are addressing in this summer institute. Why is it ‘ethical’ to implant electrodes on a Rhesus macaque and not a Chimpanzee? Are such questions solely answered using classical phylogeny? Or are attributions of some form of ‘consciousness’ being made to non-human great-apes (chimps, along with gorillas and bonobos)?

Martha Shiell  5 July 2012 17:58
Just to clarify (and not change the validity of your question), my interpretation of what he said was that we don’t implant chimps for certain types of questions. There might be other questions where the rationale for using chimps is sufficient (I don’t actually know).

With the disclaimer that I have had to apply for REB approval in animal research, I can imagine that there are reasons other than phylogeny for not working with chimps. For example, maybe they are more likely to exhibit distress in laboratory living conditions.

Julio Martinez  6 July 2012 08:00
This true, the reasons for approving a protocol are not only phylogeny. Other reasons are : is the research going to contribute to our knowledge of the human brain so we can use this knowledge to generate treatment strategies or new drugs and improve the life of humans? is it possible to use another model? does the procedure cause unnecessary pain or discomfort? is modelling an alternative? All of these are carefully examined by animal care committees that recommend the protocol for approval or not. Primates are consider level D protocols in many institutions, even if they demonstrate that the procedure does not cause pain and they minimize discomfort. Why not chimps? I do not have a good answer but if you can do it with Rhesus why using chimps? They are larger animals, they are more aggressive and difficult to handle and more expensive to keep in colonies. I have never come across a protocol that proposes working with chimps at least doing electrophysiological experiments in chimps. At the beginning of the last century some scientists did lesson experiments in chimps but as far as I know they don’t do that any longer. To finish, currently some groups conduct electrophysiological experiments in humans that undergo neurosurgical procedures, of course they need approval from the subjects and ethics committees. These are patients that undergo brain surgery for other reasons and during the procedure scientists and physicians map different brain areas and use different types of stimuli. Unfortunately these are not done very often and the controls for these experiments are not the best (for example eye movements and visual stimuli), so we cannot replace monkey experiments by human experiments. But the latter tells you the Phylogeny is not the only criteria.

Bernard J Baars  5 July 2012 17:59
I agree with Mr. Sheppard-Jones. Conscious pain perception seems to apply to all mammals, because of the well-established anatomy of the thalamus and neocortex. The brain anatomy of birds is now being interpreted in very similar ways.

Behaviorally, the signs of pain perception are extremely widely shared among species. Withings, distress cries, and the long evolutionary history of the sensory pain system all suggest that there are major ethical questions whenever we inflict tissue damage on an animal.

Chimps and macaques are primates, and are hard to differentiate from humans with respect to pain perception. Notice that we routinely study pain in these creatures, and that researchers currently use the term “conscious” to refer to waking animals of all kinds. Whether that can be proven rigorously is another question. There can be no reasonable doubt in mammals, because of the well-established anatomy, physiology, and behavioral signs.

Depression is currently studied in rats, using a “social defeat” paradigm. Socially rejected rats (it’s hard to be rejected by an attractive peer!) act depressed, their posture is depressed, the eyes are downcast, I’1l bet their vocalizations sound depressed, and of course they neurochemistry looks stressed and depressed. Testosterone goes down, they give up sooner in fights.

A search of PubMed.gov will turn up all kinds of evidence.

David Edelman and others are making the case that cephalopods may have striking similarities, in spite of their very different evolutionary history.

NOTE: I take this evidence to mean that animal experimentation raises ETHICAL QUESTIONS, not that we must avoid all animal experimentation. There are tradeoffs. It is also true that animal experiments have been crucial in saving millions of human lives.

I also feel very strongly that humans who want to eliminate all animal experiments are immature and ethically wrong.

There really are very difficult ethical tradeoffs. There are no simple answers.
Hence, any attempt to explain the function of consciousness would result in attributing a doing to feeling, and would inevitably lead to your famous objection.

If something acts upon something else, you would consider it to be a “doing”, not a feeling. I believe that defining the function of feeling is an ill-posed problem, for a simple reason.

Stevan Harnad, thinking about your ever-present objection to any speakers’ proposition as to what consciousness is for (… but this is just doing, not feeling!…), I’m starting to wonder of them is their correlated doings. Feelings have correlated doings, but they are not themselves doings. They don’t move, and the only one who can observe them is the feeler. Otherwise all one can observe of them is their correlated doings.

Therefore, any attempt to explain the function of consciousness would result in attributing a doing to feeling, and would inevitably lead to your famous objection. If feeling has a function, feeling is a doing.

ILL-POSED PROBLEM OR ILL-FATED SOLUTIONS?

"Doings" are dynamic states structures: things that move, that you can touch, measure, observe, record.

Feelings have correlated doings, but they are not themselves doings. They don’t move, and the only one who can observe them is the feeler. Otherwise all one can observe of them is their correlated doings.

So it’s perfectly natural to ask: what are the feelings for? The doings seem to be enough.

i too am, of course, a monist. So I have no doubt that the brain (doings) causes feelings, somehow. I just want to know how, and why?

Correlations are not the answer.
(By the way, if telekinetic dualism had been true, and feelings had turned out to be the 5th fundamental force, the hard problem would have been solved. Alas, all evidence contradicts telekinetic dualism: The other 4 forces can do the whole job (of doing) fine, and there’s no causal room left.)

### SUMMARY & DISCUSSION, DAY V

**V. What’s Feeling For Anyway? (Wednesday July 4)**

- **Bernard Baars** (NSI): The biological basis of conscious experience: Global workspace dynamics in the brain
- **Ezequiel Morsella** (SFSU): The Primary Function of Consciousness in the Brain
- **Bjorn Merker** (Sweden): The Brain’s Need for Sensory Consciousness: From Probabilities to Percepts
- **Paul Cisek** (U Montreal): The Vanishing Central Executive: Distributed Neural Mechanisms for Decision-Making
- **Michael Shadlen** (HHMI): Consciousness as a Decision to Engage

**Comments invited**

**Posted by Stevan Harnad**

### 3 comments:

- **Pauline Claude** 17 July 2012 07:09
  During the whole summer school, and especially on day V, we talked a lot about cognitive abilities. But what about cognitive abilities and consciousness in terms of evolution? Because we all agree that human cognitive abilities are highly adaptive, but might it be possible that the human brain (with all its higher cognitive abilities) could have evolved without consciousness? and to which extent human cognitive abilities absolutely need consciousness to fulfill their adaptive function?

- **Diego Mendoza-Halliday** 27 July 2012 09:21
  CONSCIOUSNESS AS A MEDIATOR OF CONFLICT: There is something in conflict that may be key to understanding the function of consciousness. There is conflict happening constantly in behavioural plans. Each subsystem of the brain is pushing to do something, but only one behavior comes out. Every time 2 or more planned behaviors are in conflict, there needs to be a resolution. If each of these systems wants to push out its own behavior and there is no universal rule to resolve conflicts, then each conflict becomes a separate battle of subsystems. There is where consciousness may have come into play as a mediator. It receives influences from all those subsystems at a time, and integrates these influences, giving each a particular weight, to come up with a unique and integrated behavioural output.

- **Stevan Harnad** 5 August 2012 18:22
  **CONFLICT RESOLUTION**
  Where's the conflict in a headache, an itch, or an insight?

### Christopher Pack: Vision During Unconsciousness

**Christopher Pack**  Vision During Unconsciousness

**video**

**Abstract:** Visual perception is closely associated with consciousness, and an important part of visual perception is the ability to infer the properties of objects from time-varying changes in retinal stimulation. Two key properties that are of obvious behavioral relevance are their identity and their velocity relative to the observer. In this presentation I will review old results that show how certain kinds of anesthetics impair the ability of individual neurons in the visual cortex to extract important physical quantities from retinal input. I will then present more recent work that provides a computational account of how these neurons integrate their inputs so as to become selective for important stimulus properties. Finally, I will show how the same computations appear to be at work in visual cortical regions that are responsible for different functions, including the estimation of object identity and velocity.


**Comments invited**

**Posted by Stevan Harnad**

### 17 comments:

- **Bernard J Baars** 5 July 2012 14:41
  Dear Professor Pack,
Anesthesia vs. waking consciousness is obviously an important source of empirical constraints on our understanding of consciousness. Having said that, we have various natural and artificial sources of unconsciousness (as a state), including different anesthetics. Some anesthetics could conceivably have quite "unnatural" effects on neuronal functioning by minor toxic effects on cell metabolism or membrane properties, for example. You can stop a car by putting sugar in the tank, but sugar does not give a lot of insight into the normal running of the engine.

I would like to raise some questions.

1. How do different global anesthetics affect visual neurons of the kind you studied?

2. How do natural unconscious states, like slow wave sleep, influence those neurons?

3. Some recent work by Massimini and Tononi seems to show that the peak of the slow delta wave may show waking-like activity during SWS, but only for fractions of a second, while the trough blocks fast signaling in cortex. Is there any difference in the neurons you studied between the UP and the DOWN phase of the delta wave?

4. During normal waking a number of methods have been used to inhibit conscious, but not unconscious visual processes. Including binocular rivalry, backward masking, attentional blink, and more grossly, TMS, etc.

Do your results generally converge on the findings from those kinds of studies?

Thanks very much. I'm trying to make sense of a growing mountain of evidence, and if you have any suggestions for unifying principles that explain a lot of those phenomena that would be very valuable.

Sincerely,

Bernard Baars

Christopher Pack 7 July 2012 06:55

Dr. Baars,

Unfortunately the anesthesia result that I mentioned in my talk was something that we haven't followed up on directly. But I'll try to answer your questions:

1) The results I showed involved isoflurane. We did repeat the experiment with sufentanil, which has become the standard for anesthetized primate experiments. The results looked very much like those in the alert animals, which is consistent with my understanding that opioids generally have much weaker hypnotic properties than inhalational anesthetics like isoflurane.

2) I have no direct experience in this area. There are a few reports (e.g., Livingstone & Hubel 1981, Worgotter et al., Nature, 1998) on the effects of different sleep states on visual receptive fields. I think these could be consistent with our findings if there are state-dependent effects on the nonlinearities that we have found to be crucial for stimulus integration in the extrastriate cortex. But I haven't pursued this rigorously.

3) Unfortunately we didn't record the EEGs in our old experiments! We are now spending a lot of time looking at LFP-spike relationships in the alert animal in my lab. We should have results on this soon.

4) These are excellent ideas, but we haven't pursued them. The one thing we did explore in Rick Born's lab was reversible (cooling) inactivation of MST feedback while recording from MT. Unfortunately nothing interesting happened, but the experimental design may have been suboptimal.

I wish I could provide more insight into the interesting points you raised, but I'm not much of an expert on anesthesia or consciousness. My overall sense is that the effects of isoflurane in our experiment could indeed be like sugar in your analogy -- they could affect low-level mechanisms that are not intimately associated with consciousness per se. In fact the entire output of the extrastriate cortex is in my view something that consciousness, memory, behavior, etc. can act upon, as it provides a very compact and robust code for interpreting one's surroundings, but that it's not necessarily a great way to understand consciousness. But I'm happy to be convinced otherwise!

Best wishes,

Chris

Carey YL Huh 5 July 2012 17:34

Because the sophisticated motion stimuli used in Dr. Pack's experiments were presented in a continuous motion movie (the one that he showed using youtube), I would have guessed that the neuronal firing in MST would reflect some sort of re-entrant/feedback processing. For example, does the neuron fire in a different way depending on which stimulus was presented to the monkey immediately before the current stimulus? In other words, do contents of the monkey's short term/working memory ever get featured in the firing rate? Or do you have to configure the task to be specifically about memory in order to have such effects? Are their direct connections to MST from the hippocampus (this is just for my own curiosity as a hippocampologist)?

Christopher Pack 7 July 2012 07:00

Hello,

I think it's quite likely that the MST responses reflect some feedback inputs -- the anatomy tells us that they exist in abundance, so they likely contribute something. However, we don't know what that something is, and so it's difficult to incorporate them into our modeling. We can say from our data that stimulus history effects in MST are minimal (see also Paolini et al., 2000). This likely reflects in part the fact that the monkey had no incentive to think about or attend to the stimulus. I don't recall whether there are direct MST-hippocampus connections, but the answer can probably be found in the old work by Boussaoud, Desimone and Ungerleider from 1992.

Best wishes,

Chris Pack

Martha Shiell 5 July 2012 18:07

Can someone clarify on the point that the core mechanism of the model has been used in other research to model insects. Model what in insects exactly, and how is that relevant to the validity of the model?

Christopher Pack 7 July 2012 07:04

Martha,

The locust has a well-studied type of neuron for estimating the time to contact of looming stimuli. This is something that MST does for the primate. Some of the mechanisms in the locust model are very much like our MST model (see for example Hatsopoulos et al., Science, 1995). This suggests either a common evolutionary origin or a convergent solution to a similar problem. I actually think we can understand a lot about primate vision by studying bugs.
Christopher Pack 7 July 2012 07:08
Alexandre -

The 50% figure is just a simple cross-correlation between the predicted output of the model for each stimulus and the measured response to that stimulus. If you're familiar with regression analysis, it's the standard metric used to assess the quality of the fit.

-Chris

Marjorie Morin 6 July 2012 04:23
This presentation was very interesting! So it seems to point to the fact that conscious states are related to integration of information. How does this evidence relate to the integration consensus reported by Morsella? Are we talking about the same kind of integration here? If I understood correctly the integration consensus was more about a multimodal / multi-region information integration.

Christopher Pack 7 July 2012 07:17
I'm afraid I missed Dr. Morsella's talk, but would be interested to hear more about it.

Laurence Dumont 31 July 2012 17:49
It would also be interesting to compare Dr. Pack's view with views with theories of consciousness where synchrony of the signal is key!

Etienne Dumesnil 6 July 2012 05:44
As presented earlier this week by Prof. Freedman, the MT region, which encodes information in a continuous way, communicates with the LIP region, which encodes information in an abstract binary (categorical) way.

Prof. Park presented a model in which MT (and MST) neurons' activations were predicted by applying non-linear (compressive) parameters to subunits' activations.

I wonder if this non-linear best fitting model reflects (in part) the dynamics between the LIP and the MT. Indeed, LIP reflects a higher-order organization, while non-linear dynamics offers an account of the emergence of new structure in complex open systems, which are predicted by an increase in entropy, followed by a decrease in entropy.

Thus, categorization might play a role in explaining this non-linear model.

Moreover, I notice that categorization has been little addressed through the summer school. I would have thought that given even though we receive continuous information we perceive categorical information (although this might be contested), we would have been more inclined to look for consciousness through more empirical work on categorization.
Barbara Finlay: Continuities/Discontinuities in Vertebrate Brain Evolution and Cognitive Capacities: Implications for Consciousness?

Abstract: Comparing the evolution of consciousness and its contents to the structural evolution of the brain often runs aground on basic misunderstandings about brain scaling. Because the neocortex appears ‘oversize’ in humans, for example, the presumption that the cortex must be the structure critical to multiple aspects of human cognition and consciousness is ubiquitous. Demonstration that humans have exactly the relative volume of cortex expected for a primate of our brain size demands explicit discussion of when discontinuities in awareness should be proposed when no structural discontinuities exist. When developmental homologies between vertebrate brain parts are established, and the allometries of neurons and networks are well described, true ‘discontinuities’ in brain structure prove to be very rare. Yet, there are occasional substantial reorganizations of brain connectivity that may shed light on the contents of consciousness. The reorganization of viscerosensory representation in insular cortex in large primates may enable basic changes in the perception and communication of pain and distress, a phenomenon I will term ‘the pain of altruism’.


Comments invited

Posted by Stevan Harmad

34 comments:

Bernard J Baars 5 July 2012 15:29
Thank you very much, Prof. Finlay.

I wonder if some of your points can be teased apart a little bit.

Granted that we have a lot of thoughtless corticocentrism, it seems to me that based on converging brain recording measures, including fMRI but also direct cortical recordings, in humans and other primates, that the cortex and thalamus enable the moment to moment CONTENTS of consciousness, such as reportable perceptual events. These can be assessed in other animals by match-to-sample tasks.

That does NOT mean, obviously, that subcortical and subthalamic regions make no contribution to conscious contents, but only that those contributions are "realized" or "specified" in the thalamocortical core, as argued by a number of neurobiologists. If somebody steps on my toe peripheral neurons in my toe contribute to my consciousness, but that signal is interpreted as conscious pain in thalamus and cortex, but not peripherally, though pain neurons pick up that signal quite early. Identifying a stimulus as pain may happen peripherally, but conscious appreciation of that event as pain may happen in the thalamocortical system. An early PET study by Rosen, Frith et al suggests that kind of interpretation.

That would suggest continuities rather than discontinuities, with the border of conscious perception moved quite a bit earlier than is often assumed, at least to early mammals or ancestral reptiles. I hear this from Gerald Edelman among others.

Since the enlarged neocortex and thalamus appears in early mammals and maybe ancestral reptiles, it would seem that perceptual consciousness, for example, predates primates and perhaps predates highly social vertebrates.

That line of evidence might mean that the growth of cortex enables complex and flexible social cognition in primates, rather than vice versa.

With the expansion of the frontal lobes we get language and what Gerald Edelman calls "higher order consciousness." But consciousness "as such" might be quite a bit earlier.

Panksepp and others certainly make a strong case for the PAG, but they do not (to the best of my knowledge) make a case that sub-thalamic structures support conscious contents in humans. Infant-mother bonding in humans certainly activates insula, medial cortical, orbitofrontal, and similar regions. Insula is a good candidate for conscious interoceptive emotional feelings. I'm not sure if that case can be made for deeper brainstem areas, AT LEAST in humans.

To say that information is processed or represented in some neuronal structure is not to say that it is necessarily conscious, of course. The quick and dirty test is whether it's accurately reportable.

Finally, if I can pick one small nit --- altruism is a wonderful feature of our brains, of course, but the same cognitive capacities would also seem to underlie the opposite kind
of emotions: Namely cruelty or Schadenfreude. Children are often very un-self-conscious about displaying those feelings. Cruelty based on accurate theory of mind
cognition about other minds would seem to be a pretty awful but still real feature of human cognition.

I'd be grateful for your thoughts.

Thank you,

Bernard Baars

Barbara L. Finlay  5 July 2012 07:03

Thanks for your response! I agree fairly thoroughly with the whole first section, concerning phylogenetic stability. I am much convinced by Merker's argument about
the roots of consciousness of the perceptual kind being rooted in the requirements of movement, building a world-self model. I think the evidence for the location
generating the model being di- and mesencephalic is becoming fairly strong. But, in accord with your comment, I told Steven before the talk that I was talking about
the contents of consciousness, not its presence. In the case of amplification of viscerosensory representation in the cortex, I'm imagining that this change would
allow this information to be better located (by the experiencing individual) in the body, related in more detail to the environment, described verbally in humans, taken
into account in planning and so forth, instead of primary pain and upset which might be experienced if the VM-insula pathway were not available.

I agree entirely with your remark on cruelty -- the talk I gave pasted together the cortical comparative neuroanatomy and the pain argument. My longer pain version
has a slide called "Faustian bargains" which might have been produced by this same system. Listed there are the deliberate intention (and ability) to produce pain;
malignering and possible disorders of the pain-seeking response; and a similar pattern of evolution in domesticated animals because we could help them. Have you
seen Victor Nell's article, "Cruelty's rewards: The gratifications of perpetrators and spectators" BBS 2006? It's one of my favorites. I haven't thought much as yet
about how to functionally integrate the two as yet.

Martha Shiell  5 July 2012 17:32

Finlay highlights that the differences between human brains and other mammals are relatively small. Given these similarities, to me it sense to assume that other animals
have a consciousness that is also relatively similar to ours if proven otherwise.

Martha Shiell  5 July 2012 18:08

correction: "it sense" --> "it makes sense"

Félix Mongeon  5 July 2012 20:43

It is true that Pr. Finlay showed that many properties of the human brain are not a discontinuity as they are predictable (e.g. the relative size of brain regions is
predictable since it increases linearly as the brain size increases... and she gave other examples of predictable properties). However, she did not argued that human
consciousness is similar to animal consciousness. Instead, she insisted that pain enables to exhibit advantageous actions in relation to a wider and more complex set
of social goals and stimuli (e.g. helping others and seeking help from others). Most importantly, this use of pain is not totally predictable, that is, the diversity and
complexity of social goals and stimuli do not increase linearly as a function of other predictable variables (e.g. brain size). Thus, Pr. Finlay concluded that the social
functions of pain in humans could account for human singularity. Even though other animals use pain for social purposes, this use is far less sophisticated than that
of humans.

Barbara L. Finlay  7 July 2012 07:14

Exactly. To argue that consciousness has continuity is not to argue that its domain, or the differentiation within domains are the same. I often think rather
simplytically of major brain divisions as performing a general sort of operation, the isocortex a Hebbian correlator generating statistical relationships and structures;
the cerebellum error-driven and so on. Just as those operations span entirely different domains of experience in a trout or a giraffe, so will consciousness be
operating over different domains.

Carey YL Huh  5 July 2012 19:12

The main message I took from Dr. Finlay's talk is that humans are wimps! I wonder if complaining also served some type of evolutionary advantage...

Pauline Claude  5 July 2012 20:46

Surely it does!

As a highly social species, all our behaviors evolved to cope with this socially constrained and complex environment and all our behaviors are at some point adaptive and
socially influenced (sociocultural approach) included complaining. Why do you think complaining is associated with some specific "vocalizations" (if I can say so!) and
facial expression? Because it has to be communicated to other individuals. Seeking help is really adaptive at the individual level. By seeking help you can acquire
resources for survival when your life is threatened and your condition doesn't allow you to do so. Pain recognition is also part of empathy which is itself highly
adaptive for social species as ours.

Félix Mongeon  5 July 2012 20:58

"Complaining" is a dichotomous concept that does not account for the complex way humans use pain in social contexts. I would agree that humans sometimes show
signs of distress that are disproportionate (e.g. someone who would feel mild negative emotions but that would exhibit high signs of distress). Nevertheless, when
humans "complain", this is most often accompanied by negative emotions. Thus, humans rarely show pure complaining. For your second sentence, "complaining" has
an evolutionary advantage for the person who complains since it enables him to receive more help. In some psychopathologies, complaining can show adaptive
value to some extent. Specifically, some people seek help to compensate for the fact that they lack emotional and cognitive auto-regulatory capacity.

Pauline Claude  5 July 2012 21:09

Yes Félix you're right. More and more evidence tend to demonstrate that psychopathologies may have an evolutionary history and were at some point adaptive in a
certain kind of specific environment. Seasonal affective disorder for instance (winter depression) shows interesting evidence that make us think that depressive
disorders might have an evolutionary origin and that the evolutionary advantage relies on help received from others.
Barbara L. Finlay 7 July 2012 07:28
No, I really don’t think I argued anything that would support that humans are wimps; the argument is actually the opposite, that humans are subject to more experienced pain, because to do so may give them the advantage of being helped (and I don’t mean treated medically, or having their pain treated, I mean being protected, provisioned, provided basic comforts).

I do find myself very uncomfortable, however, with finding an adaptive account of every possible illness. In evolutionary medicine, there is so much to do in sorting out what is an adaptation, who the adaptation belongs to (for example, a the upper respiratory symptoms of a cold are in support of the cold virus’s genome, in that the virus is broadcast and is not damaged by sneezing); and finally, what is simply pathology. I like Matthew Keller’s take on this (Resolving the paradox of common, harmful, heritable mental disorders: Which evolutionary genetic models. with Miller, BBS06 and further works).

work best?

Yassine Benhajali 5 July 2012 20:31
I liked Barbbara talk, but I can’t see the connection between his model of ‘the pain of altruism’ and the consciousness.

Félix Mongeon 5 July 2012 20:58
She does not explain the causal role of feelings nor does she explain the neural correlates of feelings. She talks about what functions make human singular.

Pauline Claude 5 July 2012 20:59
It’s all about communicating the pain. Pain and distress allow humans to seek help from other individuals. I know some people would say that communication doesn’t need consciousness to be effective, but in the human context, pain communication cannot occur if at least the helper is not conscious to perceive the other’s pain. I think here, pain illustrates nicely how any human behavior is so socially grounded and that all these could not occur without consciousness because it relies on human forms of interindividual communication either through language or other forms of communication involving senses (hearing, seeing, touching), meaning involving consciousness.

Barbara L. Finlay 7 July 2012 07:39
There were two different arguments intermixed. I’m using the continuity of structure in vertebrates to build a case for the continuity of basic processes. In the case of pain in humans, I’m arguing for a distinct species difference, causing a change in behavior and the contents of consciousness.

Adele Tufford 5 July 2012 20:58
I really enjoyed Dr. Finlay’s pain postulate. I’m not fully convinced, however, that other animals fail to display pain in order to elicit adaptive altruism from others. It is probably universally agreed that many mammalian infants display a type of needy behaviour (both in and out of pain). I recalled a recent(ish) Nature paper which looked at the ability of mice to convey “facial pain expression” [http://www.nature.com/news/2010/100509/full/news.2010.228.html]

If there is an overt display of pain, it is conceivable that this serves some form of communicative purpose, and it is plausible that this serves to elicit some form of response from other members of the same species. This also makes one think... do other species attempt to ‘extract’ altruistic acts from others, but we as humans (with our limited capacities to communicate via the language of other animals) are just unable to perceive and/or interpret these social pain cues present in these animals?

Barbara L. Finlay 7 July 2012 07:35
You’re right; everything has roots. I was suggesting that the source of continuity, certainly common to rodents and primates, was the mother-infant interaction, extended into the lifespan. I was really pleased to see a study just yesterday about the frequency of aloparental care (by both parents, other related individuals, and the whole group, but the target always young) - Ister, K., & van Schaik, C. P. (2012). Allomaternal care, life history and brain size evolution in mammals. Journal of Human Evolution, 63(1), 52-63. doi: 10.1016/j.jhevol.2012.03.009. You’ll see a basic level across a lot of mammals, but a big difference in primates. Check it out.

Andreas Kalckert 6 July 2012 07:10
I really appreciated her anatomical work and although I am not a 100% convinced that everything is just more or less inflation in brain size, I think it is actually a good observation to know. One could argue now that given the anatomy is so similar also the functionality must be very similar or cannot be so much different (if you are very materialistic). However, what I find very interesting now to include the following thought to this: given the anatomy is so similar, there is still the possibility that new functions arise which were shaped maybe before by certain evolutionary developments, but took then a new function in the human mind. I am thinking now of Gould & Vrba exaptation or the neuroscience version of it by Dehaene’s neuronal recycling hypothesis. So, either you argue for the very similarity between humans and other species and it is nothing more than a gradual development or you include the possibility of exaptation to create genuinely new functions which have striking new qualities than the precursor of it. Both maybe true and also the latter is an evolutionary principle. However, I think the latter is a meaningful view on the development of the human faculty.

Barbara L. Finlay 7 July 2012 08:14
I’m a big fan of the exaptation argument: here I’ll push another BBS article, Mike Anderson’s “Neural re-use” paper, which I think is terrific. It’s a mechanistic level down from the Dehaene one.

The basic theory in brain allometry has always been Jerison’s “proper mass” – if you do a lot of “x” you have a lot of brain doing “x”. Thus, people are constantly comparing, say, the amount of visual cortex in a nocturnal and diurnal animal, and attempting to show that the residual variation (the 1% after the 99% covariation is taken out) is related to “niche”. Usually people have to massage the hell out of their data to show even tiny effects in this enterprise, and to my mind, this whole enterprise is just blown out of the water by observations like Mike Anderson’s meta-analyses showing that primary visual cortex is involved in a whole number of nonvisual tasks, and the observation that primary visual cortex comes to be involved in Braille reading in the late blind. By the way, note how this approach persists in fMRI – a couple voxels more activation in the insular cortex is what causes you to be empathetic? I’d bet my last nickel that if you blew that spot (not the whole insula) out of the brain entirely, you would see no effect whatever on the capacity for empathy.

I think the better way to think about it is to look at the very real, large changes in primary motivational and affective systems, and see how the brain becomes populated with new information thereby.
Andreas Kalckert 8 July 2012 12:36
Thanks. Yes I have also some of Anderson's papers where he used also the term "massive redeployment" which I find more descriptive than Dehaene's term. Interesting idea with the fmri, I have not thought about it like this. However, there are also observations like the one Cleereman mentioned where the size of v1 is correlated to the subjective experience. Also, motor learning studies show also something similar. But I agree that inferences drawn on imaging studies only is a bit doubtful.

Talking about that: I would be very grateful if you could give me some more references on the insular to take down Craig's claims. I see his papers cited often, and it would be nice to have some more background on it. That would be great!

Matt Carland 6 July 2012 09:03
I think people have misinterpreted Dr. Finlay's pain hypothesis. The adaptive utility conferred by the alleged evolutionary expansion of the human capacity to experience pain can NOT simply be in our subsequent ability to ask for help when in a state of suffering. Exactly what kinds of pain-related behavior in various situations, they might not actually experience painful sensations in many of those. We are thus justified in using animals for experiments or suggests that (1) many animals experience painful sensations much less intensely (and for shorter periods of time) than humans do and that (2) our intuitions about what Dr. Finlay's claim about the pain of altruism might be taken to have clear moral implications in animal ethics. The argument could go somewhat like this: "Dr. Finlay's work that some people would make it.) What do people think?

Alexandre Duval

Barbara L. Finlay 7 July 2012 08:21
By the Wall placebo argument, the simple provision of any kind of help would reduce the motivational, find-help, component of the pain. I'm not imaging archaic hunter-gatherers initially producing any kind of medical help, they would just protect and provision. That would be an enormous advantage, compared to nothing!

However, I think the interaction of the placebo effect and conditioning might likely be the initial cause of a lot of folk medicine across human cultures. For example, individuals with more power are more powerful in producing placebo responses when delivering medicine.

Marie-Lou Joly 6 July 2012 13:16
Très intéressant la théorie de Dr Finlay concernant la sensibilité à la douleur chez l'humain.

Je ne crois cependant pas que seul les humains répondent à la douleur pour des raisons d'altruismes. Certains l'ont dit plus haut, certains animaux dont les primates répondent abondamment à la douleur de leurs pairs.

Est-ce que les gens d'aujourd'hui ont quantitativement plus mal que les générations précédentes ou que nos ancêtres primates? Je ne peux pas répondre à la question...

Mais même au sein de notre présente société actuelle, il y a des gens qui sont (très) sensibles et d'autres moins.

Je comprends peut-être mal la définition d'altruisme utilisée dans la présentation, mais pour moi le concept relevérait plutôt d'une sorte de conditionnement...

Quelle est la meilleure façon d'obtenir de l'attention de nos jours?

Barbara L. Finlay 7 July 2012 14:14
Notice the citation in one of the above comments about the Isler and von Shaik data about which mammals and birds "alloparent", which they specify as simple protection up to direct provisioning. Primates do noticeably more than the other groups. Notice this is providing help and protection to juveniles in this case. I am sure a similar chart could be made with much reduced incidence, but not no incidence, for mature animals. The idea here is that humans got better at feeling and also expressing pain and distress, recognizing it, and responded with help. Notice, just "help", not medical expertise!

Maxwell J. Ramstead 6 July 2012 13:22
Doctor Finlay's presentation opens to the possibility of comparatively understanding the co-evolution of sociality and cognitive structures through comparative brain studies. By correlating social behavior with brain structure, and with phylogenetic ancestry, we may be able to understand what gives rise to such complex phenomena as empathy and theory of mind. I find it fascinating that we could study the interplay of the enduring social organization of a given species in tandem with their cognitive adaptations to that situation.

Barbara L. Finlay 7 July 2012 14:18
You should check out Jim Goodson's work -- the general characterization is that particular species of birds are made calm by their preferred social situation and anxious by its absence. It becomes easy to see how a genetically "loner" bird might move away from its natal flock, feeling "anxious" in a group; acquire different skills thereby and so on. It seems much easier to me to generate new cognitive skills via sociality than the other way around.

Marthe Kiley-Worthington 9 July 2012 04:13
Darwin described dogs as 'highly emotional humans'... they are very explicit with their emotions, pain joy, excitement, expectation etc. Now either they are doing this because of empathy as Barbara argues, or they feel more rather than less. Which one is it?

Alexandre Duval 25 July 2012 19:27
Dr. Finlay's claim about the pain of altruism might be taken to have clear moral implications in animal ethics. The argument could go somewhat like this: “Dr. Finlay’s work suggests that (1) many animals experience painful sensations much less intensely (and for shorter periods of time) than humans do and that (2) our intuitions about what animals feel in specific situations might be mistaken if they are based on our expectations about what we would feel in similar circumstances. Even if some animals exhibit pain-related behavior in various situations, they might not actually experience painful sensations in many of those. We are thus justified in using animals for experiments or killing them unless we have specific reasons to believe that they experience painful sensations when we do these things.” (I am not endorsing this argument, I just expect that some people would make it.) What do people think?

Stevan Harnad 29 July 2012 19:51
That would not only be (1) justifying hurting animals on a "theory" that they feel pain less but (2) "how much" less would justify hurting them?

Nico Sheppard-Jones 31 July 2012 18:41
This is a question about the nature of a sensory experience, not of its intensity. If an animal is in pain, an animal is in pain. Proponents of your argument would be given a hard time with their affirmation that "many animals experience painful sensations much less intensely", because there is explicit recognition in that statement that animals can and do feel pain.
Jennifer Robinson  31 July 2012 09:24

Dr. Finaly explained that pain in humans has an evolutionary advantage through seeking help from others and therefore increasing chances of survival, while the experience of the same level of pain in other animals would not be evolutionarily advantageous. As has been mentioned in the above discussion there is evidence adult animals do communicate pain both facial and vocally. I was curious if there has been any comparison of experience of pain or the communication of pain in animals who live in a social community as opposed to primarily solitary animals?

Xavier Déry  31 July 2012 11:36

I absolutely love Finlay’s list of brain characteristics that change between species, reflecting what evolution changes the most. The fight against human exceptionalism goes on thanks to Finlay (and others of course) and consciousness should not be an exception.

Stevan Harnad  4 August 2012 15:57

SIGNAL INJURY MORE INTENSELY, YES, BUT WHY FEEL IT?

Lest we get too carried away with the idea that something has to be felt to be conveyed, remember that injury, detection, signalling and helping are all doings. A robot could learn (or evolve) to signal damage in order to elicit help from other robots. So something is missing here.

(The problem is the same as with the alleged evolutionary advantage of “self-deception” that was discussed in Dr. Finlay’s journal, BBS:


SUMMARY & DISCUSSION, DAY VI

VI. Feelings and Firings (Thursday July 5)

Wolf Singer (MPI, Germany) Consciousness: Unity in Time Rather Than Space?

Erik Cook (McGill) Are Neural Fluctuations in Cortex Casually Linked to Visual Perception?

Bjarne Brohm (FU Berlin, Germany) Behavioral Freedom and Decision-Making in Flies: Evolutionary precursor of “Free Will”?

Julio Martinez (McGill) Voluntary Attention and Working Memory in The Primate Brain: Recording from Single Cells

Christopher Pack (McGill) Vision During Unconsciousness

Barbara Finlay (Cornell) Continuities/Discontinuities in Vertebrate Brain Evolution and Cognitive Capacities: Implications for Consciousness?

SUMMARY & DISCUSSION, DAY VI

Comments invited

17 comments:

Vincent LeBlanc  5 July 2012 14:07

I am either very stubborn or very stupid.

Can anyone give me a definition of attention that doesn’t require a decisional force that somehow cannot be explained?

If not, then I don’t see the difference between attention and consciousness.

I’ll take the time to formulate my thoughts into something coherent and post them tonight. Feel free to comment and provide your input!

Pierre Boucher  5 July 2012 16:22

I think you are going about it incorrectly. Think about it evolutionarily. Attention evolved to select relevant information from the environment, amplify its signal and to drown out others. There is no decision per say behind what stimuli are attended to. Just rather learned or innate behaviours that the brain has matched with the most salient stimuli. Otherwise I imagine where the attention goes is up to chance, especially in completely novel situations, as with the flies we saw today.

Although I do see what you mean by attention and consciousness being difficult to separate. When you are conscious you are attending to something whether it is something physically around you or thoughts. It is difficult to imagine being conscious and not attending to something and vice versa as well.

Or maybe what you mean by decisional force?

Audrey Doualot  5 July 2012 16:40

Hi Vincent, I don’t know if it will help to clarify but for an interesting definition of attention at both psychological and neuronal levels, I also recommend the introduction of following article of Mesulam (2010): Spatial attention and neglect: parietal, frontal and cingulate contributions to the mental representation and attentional targeting of salient extrapersonal events.

It is specified for instance that no neuron is specifically dedicated to attention and that almost any neuron can be involved in attentional modulation. The author also proposed to conceptualize attention modifications into those that are domain-specific (ex: in response to visual stimuli) and those that are domain-independent (exerting through bottom up influences of ascending reticular activating system and top down influences from the frontal lobes and limbic system).

Martha Shiell  5 July 2012 16:58

I can see where the problem lies if we are talking about endogenous attention: “who” decides what to attend to? Martinez didn’t respond to this question.
Words can stimulate access to thoughts beyond the sensorimotor domain. Yesterday, tomorrow, home, Tokyo, Mars, Santa Claus all transport you outside of your immediate spatiotemporal reality. Isn’t there a component of consciousness related to the capacity to get out of the sensorimotor domain, out of the immediate spatiotemporal reality? That could explain why it is so difficult to identify sensory stimuli to generate consciousness.

It still remains basic, but C. Pack talked in his presentation about the different degrees of neural convergence ("integration") taking place as processing becomes deeper and deeper, with his example of that inferotemporal neuron getting preferentially activated at O.J. Simpson’s picture. It’s not about reaching some kind of other level of representation, but rather about the degree to which a stimulus is processed in different areas of the brain. This is consistent with the idea of attention as a neural correlate of consciousness, as proposed by J. Martinez.

However, like Martha said (and like I commented on Martinez’s answer), there’s still the problem of who is controlling attention. From a monist materialist point of view, anything referring to a soul or any form of free will is unacceptable (if you don’t agree with that affirmation, we can have a private chat, but I do not want to discuss this subject here as it might diverge from the question). I’ll start my reasoning and see where this leads me. The cause of attention focusing on a specific stimulus at a given moment is determined by both internal and external influences. Here’s a few of them: any homeostatic input from the body, social interactions, unexpected movement or sound, etc. No place for choice here, it’s all doing (to use Harnad’s nomenclature) and doing is observable, hence computable, hence implementable in an AI.

So we build this AI with an attention capacity, but no feeling or free will. Which means it doesn’t have the feeling of attending to something. So, the question is: If you don’t feel like you are attending to something, are you really attending to it? Cameras do that all the time, and I don’t think we can say they feel. Woah, I came a long way from my first statement... Anyways, from my point of view, we can have attention without feeling, without consciousness.

Now, some people argue that attention and consciousness are the same thing, with quantitative differences (one meaning being more "aware" than the other). I’d like to hear these people and know what are their arguments/reasoning. Or any other would like to share their inputs on the matter.
spatiotemporal reality, but it still is a profound example of the relationship between what is seen and what is known. If I'm thinking about a beach in Thailand right now, the stimulus which must have driven this idea to emerge probably lies in the fact that I endogenously activated an "exotic places" network which ended up on a beach in Thailand. Yet, this might consider more "consciousness" as seeing a dot on a screen, although it seems to me to rely on quite the same basic mechanisms seen so far.

As for the difference between awareness and consciousness, I think it's very interesting because it makes me think about this: In French, we don't really have different words for awareness and consciousness, both would rather be translated as "consciousness", being aware of "être conscient de". This is very interesting because, on the one hand, I'm questioning myself about whether or not we're building up different categories because there are different words in English. On the other hand, I'm in no position of the fact that if one word cannot be translated, it doesn't exist: lots of words just cannot be translated in our Western languages. I think that this gap in linguistics is very interesting: it's worth the thought.

Abstract:

Gary Comstock  : Feeling Matters

Gary Comstock  Feeling Matters

video


Un des problèmes avec l'attribution de conscience (feelings) ou de la douleur aux animaux est épistémique : tout ce que nous savons de la douleur est limité par la perspective que nous en avons. J'ai une assez bonne idée de ce que la douleur physique représente chez les êtres humains, mais il est assez difficile de savoir ce que ressentent les autres animaux, surtout lorsqu'on s'éloigne des primates.

Si la douleur, par exemple, a un rôle adaptatif particulier chez les animaux sociaux (e.g. je ressens davantage de douleur afin d'attirer l'aide de mes congénères) il n'est peut-être pas faux d'affirmer que la douleur a un rôle différent et une phénoménologie différente chez les autres espèces.

En ce sens, donner des droits aux autres espèces à partir de l'attribution de conscience/douleur me semble assez problématique.

Très vrai !

Tu as bien regardé le singe qui a l'air déprimé? Tu as des doutes? C'est pas certain.

Jusqu'à date les pommes tombent vers le bas plutôt que vers le haut, et les "lois" de la physique tiennent -- mais demain? C'est pas évident.

Ta souffrance à toi? Mâlégné ton témoignage verbal (ce qui n'est, après tout, que du témoignage verbal): Pas certain (pour autrui).

L'existence du monde externe? Pas certain.

Donc, la souffrance du singe qui a l'air de souffrir: Pas certain.

Mais si tu souhaites que les autres accordent le bénéfice du doute à toi, quand tu souffres, je te conseille d'accorder ces mêmes bénéfices à autrui.

Faut distinguer la certitude et la vérité. Il y a plein de vérités dont on ne peut pas être certain. Les vérités certaines sont les exceptions (il n'y a que les vérités formelles, démontrablement nécessaires et le Cogito: je sens ce que je sens maintenant).

Le reste n'est pas certain.

Si on s'obstine déjà à chaque commentaire sur la définition de la conscience, sur la validité écologique des expériences dites concernant les bases neuronales de la conscience, sur si la théorie de l'esprit existe chez les primates non humains, etc… je pense encore moins que de partir du conflit cartésien puisse vraiment nous aider à aller de l'avant. Je trouve ça toutefois super intéressant que je puisse demain disparaître, devenir un point noir (et encore, un point noir représenterait quelque chose à être), car tout ce temps, je n'étais qu'un personnage dans le rêve d'une autre "personne" ou "être" dont l'existence aujourd'hui m'est inconnue.

En même temps, si cela est, pour le moment où ce rêve-là dure, pour aussi longtemps que ce monde farfelu a cours, je suis prêt à m'autoriser de tenter de le comprendre à travers les outils imparfaits de la science : après tout, c'est le propre de l'être humain que de faire sens des situations les plus farfelues, non ?

Alors selon ton argumentaire nous ne devrions pas accorder de droits aux personnes "légumes" (dsl pas de meilleur mot) puisque nous ne savons pas de quelle façon elles ressentent la douleur et si elles en sont consciente?

Je suis avec M. Harnad sur celle-ci. Quand on entend un chien se faire battre et pousser des cris déchirants personnellement je n'ai pas de doute qu'il souffre, peut-être pas de la même façon que moi, mais ça me suffit!!

Oui, mais on n'est pas certain non plus que le singe souffre, tout comme si je souffre, comment peux-tu être certaine que je souffre, si tout ce monde n'est qu'une représentation théâtrale et imaginée de ton esprit fertile ? J'accepte de dire que tu souffres, que je souffre, pour que je puisse recevoir les services que tu reçois et que le singe reçois si jamais il s'en fallait à moi d'être en train de souffrir.

Mais dans la recherche de la vérité, est-ce que tout ça est vrai ? Question intéressante mais contre-productive.

Je comprends bien ton point de vue mais je pense aussi qu'enlever les droits des autres espèces sur une supposition conscience/douleur, quelle qu'elle soit, est
So, skepticism about the pains of animals is justified — but only for some species. Nor for those we typically have in mind. Evidence for claims about pain in reptiles. And I don’t see how we can make sense of the claim that there’s pain in microorganisms. There’s less the mammals, birds, and some cephalapods (see Gary Varner’s book, “In Nature’s Interests”). There is, as you probably know, debate about this issue in the fish community (altho the last time I looked at the literature, the experts seemed to be tending toward thinking some fish, at least, may be sentient). There’s less who works closely with those species has any doubts about whether they feel pain. I don’t think there are good reasons to have doubts about the sentience of any of the primates. The physiological, anatomical, behavioral, and chemical systems of homo sapiens and the Great Apes are so extensive that no scientist to my knowledge (“assign” them) but because it has certain properties that entail rights that we recognize). Here, just let me say that the epistemic challenge is not steep with other species have rights. I’ll say more about rights below (although it bears pointing out here that if a being has moral rights, it has them not because we give them rights (décapitation de masse??). En même temps, exercer un doute excessif risque de causer bien de la souffrance qui n’en vaut pas la peine. Être trop prudent et attribuer à chacun d’eux des expériences phénoménologiques afin d’éviter la souffrance nous causerait bien des soucis pour tondre notre gazon et progresser la science rapidement sans causer de souffrance, et si nous voulons être capable de savoir quand nous aurons enfin créé un AI conscient. Nous devons être prudents lorsque nous attribuons une conscience ou un manque de conscience à un organisme, vivant ou non. Être trop prudent et attribuer à chacun d’eux des expériences phénoménologiques (décapitation de masse??). En même temps, exercer un doute excessif risque de causer bien de la souffrance qui n’en vaut pas la peine. Alors oui Shady, je crois qu’il faut se poser ces questions, c’est essentiel. Elles permettent de cerner la conscience, c’est parce que nous nous posons ce genre de question que nous aurons un jour la réponse. La question "Est-ce que les animaux ont des expériences phénoménologiques?" doit se poser si on veut faire progresser la science rapidement sans causer de souffrance, et si nous voulons être capable de savoir quand nous aurons enfin créé un AI conscient. Parfaitement en accord avec Alexandre. Les primates ressentent. Les animaux ressentent. Mais plusieurs études faites sur ses mêmes animaux sont faites pour pouvoir mieux expliquer des problématiques humaines. Un sujet comme la dépression n’est peut-être pas le meilleur pour être étudié chez les singes...

Eric Millette 6 July 2012 10:11
Deux réactions courtes à vos commentaires :
1. Je crois que les primates ressentent la douleur (en doute pas), seulement que ce qu’ils ressentent est probablement fort différent. Plus nous nous éloignons des primates, plus il est ardu de savoir « ce que ça fait de » ressentir de la douleur pour un organisme.
2. Je voulais principalement faire ressortir une difficulté épistémique quant à l’argument : l’organisme à du ressenti, ergo il a des droits. Les personnes dans le coma (ceux qui ont vraiment aucun ressenti) ont des droits, ils est donc nécessaire de trouver une autre base pour leur attribuer des droits.

Parfaitement en accord avec Alexandre.
Les primates ressentent. Les animaux ressentent. Mais plusieurs études faites sur ses mêmes animaux sont faites pour pouvoir mieux expliquer des problématiques humaines. Un sujet comme la dépression n’est peut-être pas le meilleur pour être étudié chez les singes...

Stevan Harnad 6 July 2012 18:08
Eric Millette : You make the argument that if we want others to consider our own suffering, we should consider their suffering. However, I don’t think the same argument is valid for other animals’ suffering since most of them aren’t able to respond to our own suffering.
Stevan Harnad : Eric, the Golden Rule applies to humans, but it is not capitalism: You should treat others decently even if they can’t return the favor. Or, if you like, the Golden Rule’s reciprocity is here: Treat animals the way you would want to be treated by humans, if you were an animal...

Gary Comstock 7 July 2012 15:42
Alex, 
I agree that there are epistemic problems in figuring out whether some nonhuman species are conscious or not and, therefore, whether to think individuals of those species have rights. I’ll say more about rights below (although it bears pointing out here that if a being has moral rights, it has them not because we give them rights ("assign" them) but because it has certain properties that entail rights that we recognize). Here, just let me say that the epistemic challenge is not steep with other primates. The physiological, anatomical, behavioral, and chemical systems of homo sapiens and the Great Apes are so extensive that no scientist to my knowledge who works closely with those species has any doubts about whether they feel pain. I don’t think there are good reasons to have doubts about the sentience of the mammals, birds, and some cephalopods (see Gary Varner’s book, “In Nature’s Interests”). There is, as you probably know, debate about this issue in the fish community (altho the last time I looked at the literature, the experts seemed to be tending toward thinking some fish, at least, may be sentient). There’s less evidence for claims about pain in reptiles. And I don’t see how we can make sense of the claim that there’s pain in microorganisms. So, skepticism about the pains of animals is justified — but only for some species. Nor for those we typically have in mind.
Gary Comstock 7 July 2012 15:57

As I’ve just replied to Alex, I don’t think we have good reasons to wonder whether monkeys feel pain. You leave room for some doubt about whether they suffer. I agree, because I think suffering involves cognition and self-consciousness whereas pain does not—and I honestly don’t know whether monkeys reflect on their pains (revisiting past painful episodes, fearing future trials).

I also agree that we should be cautious and give the benefit of the doubt when necessary. But let me here articulate an implication of the conclusion of my paper; we don’t need to rely on a “benefit of the doubt” principle in order to empathize with depressed monkeys. They’re depressed regarding certainty and truth. I agree when you say the truth of mathematical expressions and honest self-reports of personal experience are things we can be certain about. 2 + 3 = 5, yup, and I cannot be wrong when I say, honestly, that I’m sad. But the reasons for our certainty in these two kinds of claims is different.

Gary Comstock 7 July 2012 16:07

Shady and Marjorie—there’s an ambiguity here that we might clear up by adopting the pain/suffering distinction I just introduced. Assuming that distinction makes sense to you, would you both be happy to agree that the probabilities are very high that the monkeys feel pain? And that the probabilities are somewhat lower that they suffer?

Gary Comstock 7 July 2012 16:12

Laurie-Ann, if something has moral rights it has them because of other properties, it has, such as free will or rationality or sentience. You mention consciousness and ability to feel pain, and these are also properties that are sometimes regarded as the basis for recognizing an individual’s rights. You say something is problematic (about this?), but I can’t quite see what you think is problematic.

Gary Comstock 7 July 2012 16:20

Marie-Lou, you’re right on the money that depression would be better studied in human models. And we do, of course, study it even as we try to relieve it. But how would we get controls for a scientific study? We shouldn’t induce depression in otherwise healthy people. Nor should we enroll already depressed people in trials in which some of them would receive no treatment while others received treatment. That’s the argument for using monkeys (I’m not endorsing this argument, as I’m sure you recognize.)

Gary Comstock 7 July 2012 16:27

Vincent, I agree that we have to be careful because it’s possible to assign phenomenological experiences to things that actually don’t have them. In addition to grass and other plants there are robots. Have you seen the video on Youtube of the robotic head that tells some kids that he has to leave them and he’s sad about that? They seem to express genuine sadness themselves about his impending departure, even though they can see that behind the face there’s nothing but solder and wires, so to speak. My point is your point, I think; it’s not hard to get people to attribute feelings to inanimate objects, so we ought to go somewhat slowly here.

Pierre Boucher 8 July 2012 20:18

@ Alexandre

What convinced me during Dr. Comstock’s talk was that picture of the monkey that slumped its shoulders and visibly looked depressed. If I saw a conspecific of mine with that type of body language I would know immediately that they were feeling down. A tell tale sign of what another person feels inside is their behaviour and what they do with their body. So it is not a far stretch from humans to monkeys, that that monkey is most likely depressed. And they are our close to us evolutionarily as well. And we had to get our body language from somewhere.

Even if we are not sure that monkeys “feel” I am with Dr. Comstock in saying that we should play it safe and assume that they do. If we are wrong, then we haven’t lost much but if we are then we would do a lot more damage then is necessary.

Izabo Deschenes 31 July 2012 15:47

I agree with Pierre! I am completely convinced that the monkey is depressed, although I am not sure to what extent it feels to feel depressed as a monkey (probably different than humans feel depression), but there is no doubt there is some kind of suffering there. Also, I think someone made a distinction during the discussion about killing one’s self vs. letting one self die. It seems to me just as telling that if a monkey does not feed himself, even if food is available, and ‘lets himself die’, to me this seems almost equivalent to a human suicide and clearly shows the detrimental effects these ‘depressed’ monkeys experience. I was also wondering, do monkeys ever exhibit depression in nature?

Finally, it seems difficult to weigh the benefits to humans vs. the costs on monkeys (as on Dr. Comstock’s handout). How much benefit is worth how much suffering seems like a very slippery slope to me.

Marjorie Morin 6 July 2012 07:09

Thank you for this talk! It’s a really important subject and we don’t talk enough about it. I really think it doesn’t make sense that we would deny animal rights when we don’t deny rights to humans that don’t seem to be self-conscious (as to us animals might seems to lack this self-consciousness). We feel the need to protect them and be assured that they don’t get used (and we would not use them as subject in depression reasearch as are monkeys). Why is it so different for animals: feeling superior as a species?

Gary Comstock 7 July 2012 16:36

Marjorie, one of the reasons people sometimes give for refusing to think animals have rights is that animals are not of our “kind.” I think that’s a bad argument because it’s so ambiguous. It can mean one of two things, and two things only. It could mean that other animals are of a “physical” kind unlike our kind. If that’s what is meant, then the claim is true but morally irrelevant (the fictional Na’vi—the extraterrestrials who live on Pandora in the movie Avatar—are a different species, but surely they would have rights if they existed). On the other hand, the claim could mean that other animals are of a psychological kind different from us. If that’s what is meant, then the claim is false. Animals who lack Theory of Mind are of the “same” psychological kind as humans who lack ToM. And humans who lack ToM...
reproduction. This is absolutely not obvious, but when you look a bit better, any kind of behavior in any living species (including humans) might rely on adaptations that is the

If we really understand how evolution works, it develops any species-relevant advantageous behavioral strategies in order to maximize any species its survival and

from our biology and from the fact that we are the product of the evolution exactly as all the other species...

I would like to elaborate a bit more about the comment I made at the end of Gary's talk about the probable intrinsic selfish properties of giving rights to animals. And again I
do apologize for raising such a sensible topic but there's a point where our nature cannot be denied and we have to face the evidence that we cannot dissociate our behavior

This sort of bias might also be what makes a lot of people recoil at the idea that a robot would be conscious (this is the tongue-in-cheek part of my comment, though I believe there is some truth to that).

Pauline Claude

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reproduction. This is absolutely not obvious, but when you look a bit better, any kind of behavior in any living species (including humans) might rely on adaptations that is the
In conclusion, we cannot deny and dissociate ourselves from our biology. So yes, we are all victims of our biology but our biology also allows us to have higher forms of consciousness and cognitive abilities that can guide us to generate sensible strategies to maintain our survival as a species by exploiting the resources on the most sensible way possible without falling within an excessive range. Giving rights to animals might be one of these ways.

However, despite my shocking-like words, I would like to moderate a bit my comment by saying that what I said cannot be used to justify the exaggeration in our feeding strategies and resources exploitation for instance. On the contrary, since evolution gave us our high cognitive abilities (including a higher form of consciousness), we can use it to moderate our natural resources exploitation (including animals).

In conclusion, we cannot deny and dissociate ourselves from our biology. So yes, we are all victims of our biology but our biology also allows us to have higher forms of consciousness and cognitive abilities that can guide us to generate sensible strategies to maintain our survival as a species by exploiting the resources on the most sensible way possible without falling within an excessive range. Giving rights to animals might be one of these ways.

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Adèle Tufford 6 July 2012 17:41

You are absolutely right that this assignment of the CONCEPT of human rights is a mere product of our hard adaptively-fought position at the top of the cognitive and biological food chain. That we have been granted such a biologically hard earned "right" however, even more underscores the fact that we have some form of responsibility, moral or otherwise, to at least question our exploits of other sentient beings for personal benefit.

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Stevan Harnad 6 July 2012 18:40

Yes our genes are selfish. Yes evolution is sociopathic. Yes theft, bullying, rape, murder and torture are natural. But laws and compassion are natural too, if our cultures were able to implement them and our hearts were able to create and comply with them. Animal exploitation and abuse is hence part and parcel with human exploitation and abuse – subjectively, objectively, and ethically.

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Pascal Riendeau 6 July 2012 20:29

Here's some ideas, some regarding evolution, some regarding philosophy/ethics, to try and provide a different story.

First of all, seeing all traits of our behavior as they are manifested in our current social environment as adaptations is problematic. A behavior might be a "spandrel", that is, the emerging result of the integration of otherwise adaptive traits. This result need not be adaptive, in fact it can even be maladaptive in itself so long as the components from which it emerges are sufficiently adaptive as to give an overall fitness advantage. This is not only possible, but probable given the way our brains evolved. On this topic, see "Kluge: The Haphazard Construction of the Human Mind" by Gary Marcus and much of Stephen Jay Gould's work. Also, it's not a controvertial vue that our brain has actually evolved not a solid repertoire of traits, but mostly behavioral plasticity. In which case, our minds are, as Dennett puts it, "infected" with ideas that "reproduce" and "evolve" within us to control our behavior. This is why we are ready to die for ideas. If we follow this, it becomes clear that ideas such as rights and moral constraints in general need (should) not be explained solely in terms of a biological history.

Finally, as an animal rights proponent, I must stress that I and fellow activists don't care about biodiversity in itself or as a means for our survival, we care about the welfare of individual animals. In fact, the history of the rise of animal rights advocacy traces it's roots to long before any environmental concerns were brought up (the Greeks). Our cognitive abilities allow us to reason from a normative point of view; that is, to ask ourselves questions such as "is this wrong, and if so, why?" and, in the proper circumstances, yield only to what we believe to be the better argument. That's what ethics is all about in philosophy. I'm not saying that we are immune to biological or sociological pressures, far from that! But that if we try, we can use our brain to question what "is" and envision what we think "should" be, and take precautions not to fall prone to our many biases.

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Pauline Claude 6 July 2012 20:35

When I said that we think first in our well-being is not really that we "think" so. As all mechanisms set by evolution, we are not conscious of the benefits and cost it causes in terms of fitness. My point was more that caring about animal welfare might be an adaption itself that serves, at some point, to increase our own fitness. But I quite agree with you by the way when you say that we have to "take precautions not to fall prone to our many biases". It was actually the conclusion of my post, but I obviously didn't manage to translate it into words very well!

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ANDY NDX: 20:38

Well agree. We cannot be separated from our biology and still evolution is working on us. However, we began to establish a certain second sort of evolution based on the cultural and also scientific achievements, like medical treatment. However, you could say this is a benefit as we enhance our own fitness and secure our survival. My worry is actually it will render us rather "unfit" more and more. On top I think in most cases the game between prey and predator usually establishes certain kind of balance. We don't have a real predator, besides ourselves, and we do not live in a real balance with the environment. The reason we don't cease is that we have technology e tc to overcome this "problem". Don't get me wrong, but I doubt this world is made to inhabit so many humans and maybe a some point evolution again will solve this issue by vanishing us from this planet. Anyway, I think to take Darwin and "biologize" every aspect of human life is also dangerous. Because then you end up in social darwinism. I hope your optimism that our cognitive abilities will enable us to solve those problems will be confirmed at some point in the future... :)

Pauline Claude: 20:38

You've just pointed the greatest topic subjetc of debates in bioanthropology! My answer will simply be: yes "biologizing" every aspect of human life is really dangerous, but only if it used the wrong way.

Let me finish with an analogy. Discovering the mysteries of nuclear physics has been a great advance for fields such as medicine, but it has also resulted in the creation of devasting bombs. Knowing how things work can always be dangerous, the knowledge has just to be used the right way!

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Frédéric Banville 7 July 2012 05:43

I'd like to address a few points from Pauline's original post.

1) A clarification point about the idea that " This is absolutely not obvious, but when you look a bit better, any kind of behavior in any living species (including humans) might rely on adaptations that is the result of the evolution and that increases fitness and that is before all a completely and entirely selfish strategy. "
Yes, any behavior an animal has (including humans) relies on adaptations. But that does not mean that any and all behavior we exhibit is adaptive. Bobbing my head to a piece of catchy music relies on muscular, skeletal and cognitive traits that might be adaptations (or spandrels), but bobbing my head to a catchy song isn't adaptive in itself. Humans routinely and widely exhibit behaviors that have no adaptive value at all. They also behave in strikingly unadaptive ways, from a strict gene-centered view. An obvious example is contraception. Humans are also notoriously bad at calculating probabilities and at deciding for whom to vote (in the latter case they rely on heuristics that'd make nice for enlightened dictatorship, but that's besides the point).

I am adding these considerations to the ones Pascal presented in his comment. To pick up on what he said, and sum up my point here: we have ample examples of human behavior that has nothing to do with fitness. Sure, we obviously rely on biological and cognitive traits that were adaptive (presumably) to do those things. This, however, does not warrant the claim that all behavior in humans is adaptive.

2) Regarding the claim that "This is exactly the same for the question of animal rights, a mere human species-specific strategy to ensure our own survival not paying attention to the other species. That's what evolution does and what it has always done"

As prof. Harnad mentioned, yes, evolution is a selfish process. But here are plenty of examples of species that co-evolved to develop symbiotic relationships. The survival of a species is often tied to that of other species, but not just in the sense that one species eats the other. There are more complex relationships than that. But that's not the point I wanted to make here.

The point is this: granting that evolution is a selfish process in the way you describe it (I think you're overstating it, and perhaps giving too much importance to one selective process and downplaying a lot of others), saying that the attributing of rights to animals is an adaptive behavior is a bit far-fetched. And that is because you trace the beginning of the whole "granting rights to animals" thing to the moment humans realized they were destroying their environment. That's relatively recent. Adaptive behaviors emerge from being confronted to the same adaptive problems over and over for generations. That's why humans are terrible at voting, for instance: and that is also why cognitive heuristics can play devastating tricks on us: because they didn't evolve to deal with things like the stock market or hurricane insurance. And to anticipate the objection that what is adaptive is our higher cognitive functions, which enable us to decide we should give rights to animals, that's the same as saying my jumping up and down on one leg is adaptive because my leg is an adaptation.

Pauline Claude 7 July 2012 05:54

Okay, let's change a bit my question here. What would be the utility (not to say the adaptive function) of transposing our empathic abilities to animals, plants and even sometimes to objects or ideas?

Stevan Harnad 7 July 2012 09:06

With animals we would be right, with plants we would probably be wrong (but see Mancuso tomorrow!), with inanimate objects we would be wrong, and with ideas I'm not even sure what you mean.

Pauline Claude 7 July 2012 15:10

Ideas is not really the right word, I rather meant things that are only part of our imagination (not part of the real world) such as God, fictional characters and so forth (I mean why do we feel empathic towards these "ideas")

Stevan Harnad 7 July 2012 15:53

It's their pain, and our empathy...

Pauline Claude 7 July 2012 16:01

I didn't mean animals are empathic, I meant we feel empathy towards animals. Recognizing other's pain is empathy. When you feel your friend pain because you think he's in pain you show empathy towards him. That's the same for animals. When a human sees an animal that seems to be in pain, he feels its pain just the same as he would have done towards another human. My point is just that we do not display empathic behavior only towards our conspecific but also toward non-conspecific entities such as animals, plants, and so forth.

Guillaume Loignon 7 July 2012 16:21

If plants are conscious, you will need to find a synthetic protein alternative, and fast. We need you alive and healthy!

Stevan Harnad 7 July 2012 17:47

The principle is this: Don't hurt or kill feeling organisms needlessly (e.g., just because you like the taste). One can be a vegan completely healthily and happily. If plants feel, eating them is no longer needless, for the taste, but in order to survive healthily.

Pauline Claude 7 July 2012 23:46

Well, killing an animal for food is not completely needless actually. As humans, we are biologically meat eaters. I think there are two things to separate here. Killing for eating and killing for eating in inappropriate ways. Should we make all carnivory species stop eating animal preys because their preys have feelings? Veganism is, in my point of view not the solution to stop the exaggeratory food industry (and, I totally agree that the way we manage food industry can be done needlessly at some point). Hunters-gatherers kill their preys in sensible ways for instance. Should they stop to do so because their preys have feelings? Let's just think a minute about the consequences if all human individuals had to be vegan. We'd have to start an exaggerating agriculture industry and yes, we would stop hurting feeling creatures but what about the whole ecosystem that runs the planet? All is a question of eco-equilibrium. Some people argue that it is not a matter of biodiversity but the living world is dynamic and coevolved together, and all the components have to be taken in consideration. I think there are ways to maintain an equilibrium between all the living species without having to change the diet we are "designed" for, mainly other ways than becoming vegan or vegetarian such as stop basing food industry on money and economic benefits and start doing more sensible food provisioning adapted to the diet our body is made for.
Gary Comstock  7 July 2012 16:57
Pauline, you’re surely right, that any story about our ethical values will have to explain why these values—traits—evolved. But right now we don’t have much more than just-so stories about this matter, and it’s a pretty difficult one to design experiments for. That said, it’s almost certainly true that not every value we currently hold needs to be adaptive over the long haul, and some that we currently hold may eventually prove to be non-adaptive. Those values may die out in one of two ways. Either those who hold them will prove unfit and fail to reproduce. Or those who hold them will be so widely successful at reproduction that our species will overpopulate its area and our species will crash.

But coming up with the right evolutionary account of our values is not the same thing as justifying any particular one of them. As Stevan notes, rape and slavery are “natural” behaviors and adaptive strategies under some conditions. But it does not follow from the fact that the behaviors might be selected for in some environments that they are justified. To justify (as opposed to explain) them, we must provide good reasons that the pain and suffering those acts inflict on others are pains and suffering we must accept. And that’s pretty hard to do, to come up with good reasons to justify these violations of people’s rights.

Gary Comstock  8 July 2012 16:36
Frederic, thanks for calling attention to this issue. Those who defend animal “rights” (like Regan) have different views about the issue from those who defend animal “welfare” positions (like Singer). And I have, as you point out, invoked rights in a utilitarian framework. Rights, you suggest rightly, seem incongruous in this context because utilitarians don’t believe rights have any metaphysical status. They’re “nonsense on stilts” as Jeremy Bentham had it.

Ok, but utilitarians recognize the presence and the power of the concept in our everyday discourse and laws, and they have every reason to try to use the concept to improve the world. Some of them (RM Hare, JJC Smart, Singer, Varner) freely help themselves to the idea, using it as short-hand for something like “a rule of thumb that, internalized and institutionalized, will produce the best results overall.” Strict act-utilitarians do not allow that individuals have any absolute rights (a rights that cannot be over-ridden by any other considerations). And act-utilitarians hold that we must always act so as to produce the best consequences. So, decisions may and do arise in which (the utilitarian is committed to saying) the best thing to do is to violate someone’s (alleged) right so that good may come of it.

At the level of (what Hare calls) critical thinking in ethics, there are no rights. But rights are part of our cultural discourse, part of our institutions, and powerful tools in, for example, judicial reasoning. They’re useful ways, therefore, to get what we want—and what we “should” want. So at the level of (what Hare calls) ordinary thinking, we ought to think and act as if rights have metaphysical status (or what Varner calls “deontological flavor”). The reason is that in everyday life, we are poor calculators. We are biased and not inclined to ask whether we should sacrifice our own desires for others’ desires. Sometimes we don’t have time to calculate all of the probabilities. And we’re lousy calculators, too, making errors because of our biases. Given all of these difficulties, society has evolved rules of thumb that generally produce the best results. Utilitarians are happy to see these rules codified in law, enforced by authorities, and taught to children (the 10 Commandments) as inviolable. Because doing those things will help counteract our biases and foibles in everyday thinking about ethics.

From a utilitarian point of view, as long as people’s thinking in terms of rights tends to have the effect of making the world a better place overall, we ought to keep encouraging them to think that way even if though we’re not going to use the idea of inviolable rights when we think critically.

Pauline Claude  7 July 2012 19:42
Thanks Gary and everyone for all these comments. I’m surely aware and quite agree with all what has been said so far. I wanted above all people to react to this really sensible topic! I’m also glad of your last sentence because that would have been my conclusion too: we behave guided by our human nature, but being able to judge the consequences of our actions in order to have the possibility to make choices acceptable to us is also part of human nature, and this would have never been possible without consciousness.

Gary Comstock  6 July 2012 16:37
Adele Tufford  6 July 2012 17:47
Gary, you’re right. But I’m afraid Pauline may not agree. I wonder if the differences in our methodological approaches can be attributed to our different cultures?

Gary Comstock  6 July 2012 19:44
Thanks Adele, I think you’re right. It’s important that people have opportunities to express their views. But it’s equally important that we don’t let our own views dominate the discussion. I think we need to find a way to balance these two objectives.

Pauline Claude  6 July 2012 18:18
Here is a bunch of questions/comments/thoughts/guessings that popped up in my mind when listening to Gary’s talk:

1) About the social theory of depression. Depression has to be socio-related and has to involve empathic processes. In fact, mental disorder such as depression wouldn’t have any utility if it couldn’t be perceived by conspecifics because the benefits of depression rely only on help given by the others. And as long as it involves empathy, it has to involve consciousness.

2) Feelings (especially in humans) are entirely socially “built” and “controlled”. In other words, any feeling is at some point influenced by a social component. The “feeling repertoire” (according a meaning, consciously or not, to a feeling) is continuously enriched during the development as the result of social interactions with conspecifics.

3) Are depression and suicide the direct consequence of theory of mind?

4) Depression can be seen as a disorder with an adaptive function which is to seek help from others. If it’s true, then depression should be easily cured with appropriate social interactions. However, although we live in a highly social world, social interactions does not seem to be enough to cure the symptoms of depression. If social interactions should benefit depressed individuals, why in general, affected individuals cannot find benefits from the disorder? The answer might rely on the fact that we evolved in such a different socio-cultural environment and that the sococultural environment we have today does not allow to fulfill the benefits of depression. Maybe one of the main difference would be the development of a more “depressive” environment in a more individualistic society that, despite its numerous social interactions, would not fit anymore the appropriate social responses needed to make depression adaptive in terms of benefits gained.

Juliette Collins  7 July 2012 04:37
I think it’s Allan Watts who wrote that he does not understand why we call ourselves “materialists”, since our western culture has so little respect for matter. It seems to me
that behind all this discussion of whether feeling matters is the very assumption that feeling is superior to "matter", hence a dualist view. Why not see that the whole universe is integrated, and then one will not ask oneself what is worth your respect, everything simply will be. And I truly believe that rocks deserve as much respect as animals do.

And what is so wrong about eating a sentient being? One could also see that as the greatest respect one could pay to it. The problem as I see it lies in the fact that, again because of our vitalist tendency, we value being alive more than being dead. But doesn't how we actually live actually matters more than when we actually die?

Adele Tufford 7 July 2012 16:13
Ok... in an alternate universe I suppose the greatest form of respect to another being would be to eat them after they've died thereby propagating their matter in some sort of utilitarian way. If you're going to run with this argument though you've got to be OK with eating others of your OWN species as a great form of respect - I don't see humans getting there aaannnyy time soon. I think it's a lot more practical to start talking about what feels, and what it feels like for 'it' when this 'it', whatever species it is, is exploited, tortured, and killed before their natural life-end.

Stevan Harnad 12 July 2012 18:26
Juliette, I think you need to ask yourself some more challenging questions: Would "it" like to be eaten? Would I take that as a sign of respect? If your philosophizing does not square with this obvious common sense, then perhaps it needs a little more critical scrutiny.

Gary Comstock 7 July 2012 13:06
Sorry I haven't responded sooner; my university gmail settings apparently disallow us from joining Blogspot while using our university domain. : / It took me this long to figure out the problem, which I trust I've now resolved (by creating a new gmail account.)

Thanks, btw, for these comments. I intend to respond to all of them, and soon.

Pauline Claude 7 July 2012 16:04
Another way to ask why feelings matters... WHY IS SUGAR SWEET? let's think about that...

Stevan Harnad 7 July 2012 22:09
Why is sugar sweet is really the question: why are animals disposed to seek glucose foods when their blood-glucose is low: That's an answerable evolutionary question about food preference; it doesn't give a clue of a clue about why glucose tastes sweet, or tastes like anything at all -- or why anything feels like anything at all. The glucostat (a homeostatic mechanism) is doing, not feelings.

Nico Sheppard-Jones 31 July 2012 17:20
If glucose didn't taste the way it did, I would not crave many of the things I crave. If there were no expectation of what 'feeling' might be generated by consumption of glucose, why would I seek out glucose? Why would we do anything if we didn't have some form of expectation about feelings that might result from 'doing' a particular thing?

Doing without feeling? Sure, a robot can. But WHY does a robot do? Let's re-contextualize all the talk we have had about robots. A robot does what it does because WE told it to 'do so'. Could feelings, or expectations about feelings, drive 'adaptive' doing?

Stevan Harnad 5 August 2012 17:07
IF ROBOTS GREW ON TREES
...what difference would it make?

The point is that those feelingless causal devices seem to be able to do all the things we do feelingly. What feelings are for remains unexplained. (Certainly not explained by saying that if sugar didn't taste sweet you wouldn't eat it. Well, yes, but the question remains why?)

Roxane Campeau 12 July 2012 11:14
POSTED ON FB, during the talk.

Roxane Campeau

Would I be right if I'm concluding from Pr. Comstock talk that there is no levels or kinds of consciousness, but instead, a palette of feelings spread out through species?

Then, is there a hierarchy of feelings? Does ToM govern this hierarchy? Is there a ToM felt and a ToM unfelt like Stevan put it on an other post, or feelings surrounded or not by ToM? I'm confused....again!!

Stevan Harnad

Animals feel. And feelings matter.

FREDERIC-ISMAEL BANVILLE

While I'm not too certain of his process for getting to that conclusion (see comments on blog), I think that this core insight is extremely important and should have serious implications for the study of consciousness. Namely: consciousness as feeling is not an exclusively human trait.

6 juillet, 11:47

Stevan Harnad 12 July 2012 18:31
I'm not sure what you mean by a hierarchy of feelings: More pain is worse, and more important, than less pain, but that's not a hierarchy. If Theory of Mind makes a pain last longer, maybe it makes it worse, but, more likely, ToM goes with more episodic memory, and more memory makes pain last longer. (ToM is more relevant to the pain-giver than the pain-getter.)
David Rosenthal: Does Consciousness Have any Utility?

David Rosenthal  Does Consciousness Have any Utility?

Abstract: It is plain that an individual's being conscious and an individual's being conscious of various things are both crucial for successful functioning. But it is far less clear how it might also be useful for a person's psychological states to occur consciously, as against those states occurring but without being conscious. I'll restrict attention here to cognitive and desiderative states, though similar considerations apply to perceiving, sensing, and feeling; like cognition and volition, all these states are useful; the question is whether any additional utility is conferred by any of these states' occurring consciously, and I'll offer reasons to think not. It has been held that cognitive and volitional states' being conscious enhances processes of rational thought and planning, intentional action, executive function, and the correction of complex reasoning. I examine these and related proposals in the light of empirical findings and theoretical considerations, and conclude that there is little reason to think that any additional utility results from these states' occurring consciously.

If so, we cannot rely on evolutionary adaptation to explain why such states so often occur consciously in humans and likely many other animals. Elsewhere (Consciousness and Mind, Clarendon, 2005) I have briefly sketched an alternative explanation, on which cognitive and desiderative states come to be conscious as a byproduct of other useful psychological developments, some involving language. But there is still no significant utility that these states' being conscious adds to the utility of those other developments.


Comments invited

Posted by Stevan Harnad

79 comments:

Stevan Harnad  6 July 2012 08:16
WHAT MAKES UNCONSCIOUS "THOUGHTS" "MENTAL"?

In reply to Emma's question about what makes unconscious processes "mental":

(1) David Rosenthal wants an "argument" for the possibility of unfelt feelings (unconscious red, loud, etc.). That's a call for an argument for a contradiction.

(2) David also says intentionality can be unconscious. (Intentionality means "aboutness"). So there can be the unconscious "thought" that the "the cat is on the mat" because that unconscious thought is about the cat being on the mat.

But either "the cat is on the mat" is just an internal sentence (a string of meaningless symbols, as in a book or a computer, with the interpretation, hence the "aboutness" coming from the external reader or user), which is mere syntax, with no "aboutness," or it is David who must give an argument to explain how unfelt thoughts are about what they are about, or about anything at all, on their own, without the mediation of an external (thinking, feeling) interpreter.

David Rosenthal  8 July 2012 03:49

(1) Stevan says I wanted an argument for the possibility of unfelt feelings. I don't recall that request. Instead, I asked for an argument that mental states--e.g., thoughts, expectation, desires, perceptions, sensations, emotions, etc.--cannot occur without being conscious states. My understanding is that Stevan uses the adjective 'feel' much as I use the term 'conscious':--when that term is applied to mental states--states of the sort listed above.

To reiterate what I said in discussion--and all too briefly in the talk; I regard a state as mental not by appeal to to the state's having one or another of two defining characteristics: intentional properties or qualitative properties.

Intentional properties are intentional content (that something is the case) together with what Russell called a proposal attitude (here I'll give examples: thinking assertorically, expecting, desiring, doubting, wondering, etc.). If a state has intentional properties so defined, it's a mental state. Qualitative properties are props like the redness, paintfulness and so forth that occur in perceiving and sensing the existential environment and in bodily sensations.

I hold that both types of property can and often does occur without being conscious--without an individual's being at all aware of their occurring, at least unaware of their occurrence without appeal to to conscious inference or observation. Intuitively, that amounts to one's being unaware of their occurring except by appeal to to the third-person techniques that we use to test when "other" people and nonhuman animals are in those states.

What I was asking for an argument for was why one should think that this last paragraph is mistaken: Why mental states, so defined, cannot occur the individual's being at all aware of their occurrence--except by third-person means.

I think it's not a good to put things in terms of whether there can be unfelt feelings. If 'feeling' just refers to mental states and 'unfelt' simply refers to a state's not occurring consciously, noth as defined above, there's no problem about the occurrence of unfelt feelings. But putting the issue using those terms creates an unnecessary and, I think, theoretically loaded impression of contradiction. So it creates an unnecessary and theoretically loaded sense that mental states cannot occur without being conscious. Putting the issue in more neutral terms therefore seems to be to be preferable.

THAT'S ABOUT STEVAN'S FIRST COMMEWNT; THE BLOG WON'T ACCEPT MORE. I'LL TRY ANOTHER WAY.

David Rosenthal  8 July 2012 03:50

THIS IS THE REPLY TO STEVAN'S (2):

(2) Stevan's skipping the part about hold an attitude toward the intentional content; I don't regard the mere occurrence of intentional content as sufficient for a state's being mental. I regard it as sufficient only if the state exhibits intentional content "and" the individual exhibits evidence of an attitude toward that content.

There are many reasons to think that intentional content occurs without being conscious. All one needs is a theoretical reason (theoretical, because one cannot in these cases go on first-person access) to identify the occurrence of a state as exhibiting intentional content. I favor am conceptual-role theories, which regard states s having intentional content if they have the kind of causal potential toward behavior, stimuli, and "most crucially" other inner states that we take "conscious"
intentional states to exhibit. It's the causal potential, not one's being aware of being in the state, that's responsible for the state's having intentional content.

Stevan says that if such a state isn't conscious it is "just an internal sentence (a string of meaningless symbols, as in a book or a computer, with the interpretation, hence the "ableness" coming from the external reader or user), which is mere syntax, with no "ableness"." I myself see no good argument for that, being unconvinced by Searle's 1990 target article in Behavioral and Brain Sciences. I recommend in that connection my commentary on that target.

Stevan Harnad 12 July 2012 14:18
WHAT MAKES A MENTAL STATE MENTAL? (Reply to David Rosenthal's Reply 1)

David and I differ (profoundly!) on what makes a mental state mental -- hence on what we mean by "mental". David thinks it's a bunch of things. I think it means one and only one thing: An internal state is a mental state if and only if it is being felt (i.e., a felt state).

If an internal state is not being felt, it is not mental, even if it occurs in the brain of an organism that is capable of mental states, even if it occurs while (other) mental states are being felt, and even if it is part of the brain substrate of a state that could eventually become a felt state.

"Mental" (as applied to "state") is synonymous with "conscious," "aware," "experienced," "subjective," "qualitative" etc. etc. as applied to "state." And in order to avoid equivocation, obfuscation and question-begging, I strongly urge sticking to the word "felt" and avoiding all those other weasel-words.

An "intentional" state is only mental if it is felt. Otherwise it is merely a state that can be interpreted (by someone who has mental states) as being about something.

In that sense, an unfelt "intentional" state is more like a sentence in a book or a computer than a thought that is being thought by a feeling thinker. (And of course I don't think the "mark of the mental" is intentionality ("ableness"), but feeling, since intentionality can be either mental (felt) or non-mental (unfelt).)

(It should be clear that on this sense of "mental," an argument that there could be unconscious mental states would indeed be an argument that there can be unfelt feelings. If I am wrong to equate mental with felt, then what I have said is indeed theoretically loaded; but if I'm right, then it is theoretically lightened!)

FELT AND UNFELT "ATTITUDES" (Reply to David Rosenthal's Reply 2)

Attitudes, like intentionality and internal states in general can be felt or unfelt. If unfelt, they are not mental. A sentence on a page has a lot of causal potential if taken up and acted upon by a feeling mind. But if taken up and acted upon by an unfeeling robot (or by a feeling mind, but without feeling it), the sentence is not mental.

Searle's 1990 argument in BBS is that an unconscious state is mental if it is potentially accessible to consciousness. By my lights, that means it's mental if it's potentially felt. I would rather say it's mental only if it's actually felt. (The pinch you gave me while I was ranting about the definition of consciousness may have been potentially felt, but I didn't feel it; so it isn't and wasn't mental, though perhaps with a few attentional switches swapped, it could have been. Ditto for the sentence on the page that my eyes wandered over whilst I was thinking of something else; or even the inchoate thought that I missed thinking because I was in the thralls of a rant about the meaning of consciousness…)

David Rosenthal 13 July 2012 05:51
AGAIN: I NEED BECAUSE OF LENGTH TO BREAK MY POST IN TWO PARTS.

PART I:
Reply to Stevan--about what makes a state mental:

I don't think it's quite right to say I think that it's a bunch of things that make a state mental. I do think that there are two families of mental properties--intentional properties and qualitative properties. And a state's having properties from at least one of those two families suffices to make it mental.

One could raise a question about why a state's being mental, which one might think of as a unitary matter, should be exemplified by two distinct types of property. I don't think that that's such a problem. Both intentional and qualitative properties are representational. The intentional content content of thoughts, desires, expectations, doubts, and the like, e.g., all represent whatever that intentional content is about. And the qualitative character of sensations of red and of a good wine represent the physical properties of something's being red and the physical property of being a good wine, just as the qualitative character of a state represents disturbance or damage to a part of the body. Part of what unifies intentional and qualitative properties is their representational character.

Another part is that states that are mental in virtue of having properties belonging to one or both of those two types, though they are not always conscious--in Searle's terms not always "felt"--are all such that they are type of state that can be felt. That's a second characteristic that unifies a state's having one or the other of the two types of property. And these two unifying factors are enough to undergird our sense that a state's being mental is a unitary thing.

Stevan denies this, writing that "[i]f an internal state is not being felt, it is not mental." And he writes that "Mental" (as applied to "state") is synonymous with "conscious," "aware," "experienced," "subjective," "qualitative" etc. etc. as applied to "state." I am not sure what is "substantively" at issue here--as against David's and my uses of words--that would make Stevan right and me wrong, or conversely? I don't see anything.

Stevan thinks I use weasel words in my account of things; I don't see anything at all unclear about my uses. But my use has an advantage his lacks: Mine usage highlights the way states we are aware of ourselves as being in resemble in very salient ways states that we have third-person evidence we are often or sometimes in, though without first-person access to our being in them.

Stevan thinks I what I call an intentional state is, if one isn't aware of it in a first-person way, "merely a state that can be interpreted (by someone who has mental states) as being about something." I think we have substantive reasons for seeing such states that way. We shouldn't be misled by Stevan's disparaging use of 'interpret'; all that amounts to is having substantive reason to classify a state in a particular way--as having the relevant kind of representational properties--i.e., intentional content.

David Rosenthal 13 July 2012 05:52
PART II:
Stevan holds open the specter of misapplying the notion of intentional content because we have no reason to withhold it from computers if we apply it to states to which the being in question does not have first-person access. I think this is a manufactured worry. We know on holist grounds--how particular states interact with one another and with inputs and outputs--that the states computers are in don't (at least as current computers operate) interact in sufficiently rich ways to see those states as having intentionality. But contrast, there are plenty of nonconscious states people and other animals are in that do interact in sufficiently rich ways to warrant our regarding them as having intentional content.

What do I mean by holist interactions? I mean causal interactions, actual and potential, with a very great many other states and with many actual and possible inputs and outputs.

About felt and unfelt attitudes:

Here Stevan raises the worry that we may not be able to distinguish the intentionality of sentences written on a page from the intentionality I assign to states of which
individuals aren't aware in a first-person way (aren't felt). Again, I think there is nothing serious to worry about. Sentences written on a page simply don't interact in the
d Holist way with anything else, though they do, when read, have one-on-one causal ties with actual mental states in the reader's mind (and when written such ties with
intentional states in the writer's mind).

Stevan Harnad  14 July 2012 09:21

RICH INTERACTION POTENTIAL

DR:
"Both intentional and qualitative properties are 'representational':
'Representational' is alas another weasel-word! Felt or unfelt representation? If unfelt (a picture, a text, a computational or robotic or neural state) it is just a state.
Nothing mental about it at all.

DR:
"Mental states are not always felt but a 'type' of state that can be felt":
Sounds like potentially mental states, rather than actually mental states. As for mental potential: who knows, this carbon atom might be a part of a potentially mental
state, even if it's in a fossil, cadaver or oil-spill...

DR:
"What is substantively at issue -- as against merely verbal?"
An explanation of how and why we feel.

DR:
"States we feel resemble states we don't feel":
Resemble them how?

DR:
"Holist interactions are actual and potential causal interactions with many other states and many actual and possible inputs and outputs":
What (apart from the robotic Turing Test [T3]) is the test of whether states are sufficiently interactive. (And T3 is all about doing, not feeling.)

DR:
"We know (current) computers don't interact in sufficiently rich ways whereas plenty of non-conscious states in people and other animals do":
What (apart from the robotic Turing Test [T3]) is the test of whether states are sufficiently "rich"? (And T3 is all about doing, not feeling.)

DR:
"Sentences on a page don't interact in the holist way with anything else, though when read they do have one-on-one causal ties with actual mental states
in the reader's mind":
When read into a feeling reader's head, sentences become part of mental states (like the carbon atom).

David Rosenthal  14 July 2012 09:58

There may not be a one-liner about what it is for a state to be mental, and the quest for a one-liner may midlead.

i didn't say that anything representational is mental. I said that being representational is one (of two) aspects that intentional content and qualitative character,
construed as properties of states of people and other creatures (almost certainly computers of the not too close future). It was not part of a definition of mental on its
own; I offered intentional content and qualitative character for that, and offered representational character as what those two kinds of property have in common: that
they have it in common with other things isn't relevant.

Stevan says that my saying that mental states are not all conscious, but rather a type that can be conscious, "[s]ounds like potentially mental states, rather than
actually mental states." What is there about the world, as against a propensity to use words in one way or another, that would settle that issue?

Stevan asked this question by saying that what is substantively as issue and not merely verbal is "[a]n explanation of how and why we feel." Answer: States that we
are in, which are not in themselves or always conscious states, sometimes are. The explanation of how and why we "consciously" feel will consist in explaining how
and why some of those states are conscious. Simply having as a desideratum "[a]n explanation of how and why we feel" does not decide between the view that the
term 'mental' applies only to states that are conscious (felt, as Stevan puts it) vs. the view that it applies to states that can be conscious but often aren't.

Stevan asks how nonconscious mental states resemble conscious mental states; in their qualitative and intentional properties.

Maybe the robotic Turing test is a good way to tell whether the holist interactions a state has with other states and with inputs and outputs are rich enough to count
as mental, I'm neutral about that. And, yes, of course it's not about only conscious mental states, but about mental states generally, both the conscious ones and the
ones that aren't conscious ("felt").

Stevan writes, "When read into a feeling reader's head, sentences become part of mental states (like the carbon atom)." I'm not sure I understand. The sentence
remains on the pages; it isn't read "into" anybody's head, but read "by" somebody. Its semantic (and possibly other) properties are represented in the reader's head.
The sentence has very few interactions with other states, and none to speak of with other inputs or directly with outputs.

Stevan Harnad  21 July 2012 15:38

THE MARK OF THE MENTAL (1 of 3) Reply to David Rosenthal (DR)

"Representational" has the same problems as "intentional": It comes in two flavours. Mental (felt) and not (unfelt).

The distinction is along the same line's as Searle's intrinsic intentionality vs. extrinsic or derived intentionality. A sentence or an image or a thought or a proposition
are not "about" something unless a feeling entity is actually saying, seeing, thinking or meaning them. And it feels like something to be saying, seeing, thinking or
meaning something.

Otherwise a sentence or an image on a page or inside a computer or robot, or an unfelt internal state inside a feeling entity that is systematically interpretable as being a
thought or proposition, but not actually being felt, is simply an internal state, as in a toaster or teapot: nothing mental about it at all.

DR: "What is there about the world, as against a propensity to use words in one way or another, that would settle that issue [of whether or not unfelt states are
'mental']?"

The only issue about which there is a fact of the matter is whether and when an entity has felt states. (The feeler knows for sure.) What we decide to call states other
than felt states is, as David says, a matter of word-choice (except if we decide to call them "felt" in which case we can only call them felt if and when they are indeed
felt).
If there were only unfelt states, there would be no "hard" problem, just toasters, teapots, and darwinian zombie-organisms, including talking ones.

**DR:** "States that we are in, which are not in themselves or always conscious states, sometimes are (conscious)."

Conscious is again a weasel word here. The above sentence would not even make sense if we unambiguously used "felt" instead of "conscious":

"States that we are in, which are not in themselves or always felt, sometimes are (felt)"

The only states that are felt are the states that are felt. An unfelt state is unfelt. If it "resembles" a felt state (say, shares some of its neural substrate), that's interesting, but only because it focuses the mystery on why and how the neural difference between the unfelt state and the felt state makes the felt state feel:

**DR:** "The explanation of how and why we "consciously" feel will consist in explaining how and why some of those states are conscious."

Again, the weasel-word, creating what looks like alternatives out of synonyms:

The unambiguous way of putting it is "The explanation of how and why we feel will consist in explaining how and why some states are felt."

The only way to feel is consciously. There is no "unconscious feeling" (unfelt feeling) (though there can be unconscious states and processes, as well as unconscious responses and capacities, neural and behavioral).

**DR:** "an explanation of how and why we feel" does not decide [whether] 'mental' applies only to states that are conscious (felt, as Stevan puts it) or to states that can be conscious but often aren’t."

"Mental" is yet another redundant weasel-word. David wants to use it for internal states that are somehow "potentially" felt, or potentially "part" of states that are felt.

We could by the same token say that they are only "potentially" mental, or potentially "part" of states that are mental.

Or we could just throw out the redundant weasel-word "mental" and say states are felt if they are felt, and unfelt if they are not: "potential" and "parts" have nothing to do with it.

[1 of 3, continued]

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**Stevan Harnad** 21 July 2012 15:40

THE MARK OF THE MENTAL (2 of 3) Reply to David Rosenthal (DR)

**DR:** "Stevan asks how nonconscious mental states resemble conscious mental states, in their qualitative and intentional properties" Unfelt states have no qualitative properties. And intentional properties are merely derivative if/when they are unfelt, the way the interpretability of a sentence in a book or a state in a computer or a VR simulation is parasitic on the (felt) state in the head of the reader or viewer.

**DR:** "Maybe the robotic Turing test is a good way to tell whether the holist interactions a state has with other states and with inputs and outputs are rich enough to count as mental. I'm neutral about that."

The only thing the robotic TT can do is show you what states and processes are sufficient to generate behavioral capacity (doing) indistinguishable from that of a feeling human being: interacting with the world, interacting with other human beings with words and other doings.

The actual nature and richness of the "holist interactions" of internal states with other internal states, and with inputs and outputs awaits the findings of future cognitive science (and progress on designing models that can pass the robotic TT).

It is not clear to me how something so vague, let alone some hypothetical continuum of "richness" can tell us what does and does not count as mental. Correlations there will certainly be, between our felt and unfelt states, and our brain's internal states. There will also be such correlations with the TT robot, though we may be inclined to be a trifle less confident about whether it is indeed feeling, when it says and behaves as if it is. Turing recommends giving in the benefit of the doubt, faute de mieux, and I incline the same way.

Perhaps at Turing scale we will have an idea of what the continuum of "richness: underlying "holist interactions" actually consists in, functionally speaking, if there is indeed such a continuum. We may even find the cut-off point along that continuum where feeling actually kicks in, if we can take the robot's word for it (and we should). But that will be just the same as if we find the neural correlates of unfelt and felt states: Whether on a continuum with a threshold between felt and unfelt, or simply functionally different state sharing some features and components and not others, we still will not have addressed the hard problem of explaining how and why the felt ones are felt.

[2 of 3, continued]

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**Stevan Harnad** 21 July 2012 15:41

THE MARK OF THE MENTAL (3 of 3) Reply to David Rosenthal (DR)

**DR:** "It's not about only conscious mental states, but about mental states generally, both the conscious ones and the ones that aren't conscious ("felt")."

This is unfortunately back to splitting synonyms: "It's not about only felt internal states, but about internal states generally, both the felt ones and the ones that aren't felt."

Well, yes, but I think we've already agreed that it's just a matter of word-choice if we decide to call the unfelt internal states of a feeler "mental" just because they're going on inside of a feeler rather than a teapot.

Not so for "felt," about which there really is a fact of the matter (but you have to be the feeler in order to feel it).

**DR:** "Stevan writes, 'When read into a feeling reader's head, sentences become part of mental states (like the carbon atom). 'I'm not sure I understand. The sentence remains on the pages; it can't read 'into' anybody's head, but read 'by' somebody. Its semantic (and possibly other) properties are represented in the reader's head. The sentence has very few interactions with other states, and none to speak of with (other) inputs or directly with outputs."

The sentence "The cat is on the mat," when it appears on this screen, is not part of a mental state. When you see and understand it, so that you are thinking "The cat is on the mat", then it is part of a mental state, because it feels like something to think "The cat is on the mat". (Searle's extrinsic or "as-if" intentionality vs. intrinsic or "original" intentionality again, though I don't really like that dichotomy: Unfelt vs. felt "meaning" is better.

Bref, Brentano was mistaken. The mark of the mental is not intentionality but feeling. To have a mind is to feel. And an internal state -- even an internal state in an organism that is capable of feeling -- is only mental (felt) if and when it is being felt. The rest is just internal states and processes, as in a robot, or teapot.
David Rosenthal  22 July 2012 06:21

I do insist that intentional and other representational states occur consciously or not (felt or not in Stevan's terminology). I don't accept that Stevan and Searle are right that such states aren't just as mental in nonconscious as in conscious form. There's no issue about what makes them mental when they are conscious; teapots are in qualitative states in that they aren't responsive to stimuli in ways that allow fine-grained discriminative responses (see my "How to Think about Mental Qualities," on http://tinyurl.com/drpubn). Similarly with intentional properties; teapots don't have mental attitudes toward a range on intentional content. Nonconscious intentional properties are not Searle's derived intentionality; nonconscious intentional states have intentional content and mental attitude because of causal and dispositional ties with other is (perhaps none of them conscious) and stimuli and inputs.

Stevan objects that this is not a strict line. But it's not obvious that 'mental' as opposed to 'conscious' applies in a strict, on-or-off way. There can be and are many borderline cases. But the existence of borderline cases doesn't mean that there are overwhelmingly many clear cases.

Stevan follows Searle in holding that nonconscious mental states are "internal states that are somehow "potentially" felt, or potentially "part" of states that are felt." That's simply not how I'm using the terms. Read the foregoing article and my "Intentionality," available on http://jgc-curny.academida.net/David Rosenthal .

About.

Using consciousness as a necessary condition for states that be mental rules by unsubstantiated fiat a very great deal from research projects—research into states that have everything in common with conscious mental states except for being conscious. And that's no need for such a shortcut, one-stop mark of the mental; it can be the more complex mark I have argued for. That's what I had in mind in describing it as a verbal matter.

Stevan's "translations" of 'being conscious' into 'being felt' aren't neutral; they create a sense of paradox where there is none. There's no paradox in a state's being mental but not conscious or not felt—i.e., one isn't aware of the state; there is a paradox in a state's not being conscious but being felt.

Stevan and I agree that written or spoken sentences are not part or aspects of intentional states; he follows Searle in seeing such srnits as analogous to intentional states that aren't conscious; I deny that that's all a useful analogy, relying for nonconscious intentional states instead the factors I list above.

Nobody doubt that explaining intentional content and mental attitude and explain mental quality is a serious explanatory challenge. I believe I have made good process, as have a number of others in the field. Stevan's use of being felt to distinguish mental from nonmental is using an uninformative one-liner (being felt) for the hard work of explaining intentional content, mental attitude, and mental quality.

Stevan Harnad  22 July 2012 17:51

ZOMBIE STATES

For the perplexed reader, here is what the disagreement between David and me hinges on:

Let us call unfelt internal states, occurring inside the brain of an organism that can feel, "zombie states."

The reason I call them zombie states is that I think we all agree that if an organism's brain had only such states, and could still do and say everything that a normal human being can do and say, then it would indeed be a zombie (i.e., a Turing-Test passer [T3] that was indistinguishable from us, yet did not feel).

Now let us remember that the "hard" problem is explaining how and why feeling organisms feel. So for an organism that had only zombie states, there would be no such problem. All that would need to be explained was how it could do and say everything it could do and say ("easy" problem!).

Now back to reality: The human brain can indeed feel. And it has both zombie states and non-zombie states.

So the disagreement with David is over what to call some of the brain's zombie states. I think David wants to call those of them that share some of the properties or parts of felt states "mental states", whereas I'd rather reserve "mental" only for the felt ones. (The hard problem is, after all, traditionally called the mind/body or mental/physical problem!) David and I do agree completely with David that this is purely a verbal matter.

[By the way, none of what I've said implies that I believe that a zombie could pass the Turing Test.]

But I do agree completely with David that this is purely a verbal matter.

David Rosenthal  27 July 2012 09:28

I don't think I quite agree with Stevan about where he and I differ. I don't myself think it's reasonable to stigmatize nonconscious mental states as zombie states; they're mental, according to me, in every way that conscious ("felt") mental states are: They have intentional content and mental attitude or they have qualitative character, often both.

If I'm concerned about whether somebody else is in one or another or indeed in any mental states, it doesn't matter to my determining that whether those states are conscious ("felt"); I have nothing to go on but that individual's behavior. That includes of course verbal behavior—possibly being apparent testimony to the individual's being in one or another conscious state; but robots and so forth can engage in such verbal behavior.

I think Stevan and I are agreeed that whether to call nonconscious states with intentional or qualitative properties mental is a verbal matter. Given that, I don't understand his insistence on the more restrictive usage. My more inclusive usage has the advantage of connecting more phenomena together.

Stevan Harnad  5 August 2012 18:27

Unconscious qualitative character? Who's enjoying the quality? And in what does the quality consist, if it is not a feeling?

Alexandre Duval  6 July 2012 10:32

Several things: (1) My understanding is that the Wason logical experiments and similar work apply just as well to conscious cases of reasoning. (2) Just because efficacious reasoning stimes occurs consciously is not sufficient to show that its being conscious is implicated in the degree of efficiency. It might be that demands on reasoning produce "both" awareness of the reasoning "and" efficiency of reasoning, but that those are independent effects.

David Rosenthal  8 July 2012 03:56

On his way to the conclusion that conscious states do not have utility in virtue of being conscious, Rosenthal claimed that there are many conscious processes that are less efficient than similar unconscious processes. (If I remember correctly, he cited the work of Dijksterhuis that shows that consumer make better choices when their volition is the result of non-conscious reasoning.) But I feel like many of the things done in the context of the heuristics and biases research program by Tversky and Kahneman show that at least in specific circumstances we can make much better decision by relying on conscious processes. We have many non-conscious heuristics (producing stuff like anchoring effects) that can mislead us in very dramatic way when we make decisions. This is especially clear when it comes to logical reasoning (Wason selection task and so on).... However, even if I am right, Rosenthal might be still right that it is not in virtue of being conscious that conscious processes can be more efficient in some cases.
Marie-Lou Joly 6 July 2012 11:55
Rosenthal a parlé de l'apprentissage du tennis.
J'ai beaucoup de difficulté à saisir un moment où ce genre de sport pourrait devenir possible sans l'apport de la conscience. Je comprends le point de vue que la conscience n'est pas toujours utile, mais réfléchir cela en donnant l'exemple du tennis ...
Le tennis ne se résume pas à essayer de toucher une balle avec une raquette. Je n'arrive donc pas vraiment à saisir comment un comportement (frapper la balle de manière à déjouer l'adversaire) peut être indépendant du "readiness potentiel".

David Rosenthal 8 July 2012 04:01
I'm not certain I understand; my French is very poor. My apologies for that
The tennis case: Mmg a new skill and set of motions certainly requires close attention and control of behavior. WHo's needed is a reason to think that attention and control cannot occur without conscious mental states. I know of none. There is now a huge literature demonstrating that attention of all sorts occurs without the attentive mental states' being conscious (see work by Koch et al, Tsuchiya et al, Konrtrtiege et al). Similarly for control.

It may seem to these things occur only consciously; but that subjective impression must not be relied upon, since our subjective impressions only extend as far as those mental states that "are" conscious, and do not at all apply to mental states that are not. So introspective subjectivity cannot be any guide at all for these issues--abt whether mental states' being conscious is needed for one or another task.

Maxwell J. Ramstead 6 July 2012 13:12
My apologies, but I still have the feeling that, in the absence of some explanation of what the causal incidence of conscious mental states could be, Doctor Rosenthal is committing himself to a form of epiphenomenalism. If conscious a mental state, M, is a higher-order thought about another mental state, N, one would suppose that M would have to occur after N. For M to be about N, N must already be instantiated in some way. The higher-order state always occurs after the fact, and hence, M cannot have any causal role. He argues that they could have some causal incidence despite having no determinable functional role, yet I do not see where, how, or when such an influence could exert itself.
Maybe I'm missing something.

David Rosenthal 8 July 2012 04:48
There are very many things that have causal efficacy but no utility. Most occurrences are like that. If having no utility is what you mean by epiphenomenalism, yes, I'm arguing for that. But I don't see what the reason is to be back merely because the word is applied.

On the other hand, 'epiphenomenalism' in philosophy means having no causal efficacy; that is, I agree, a silly view. But I am in no way committed to it. Not everything that happens—even in the mind—is useful.

Please note what I stressed in my talk: My arguments against utility do *not* in any way depend on first adopting the higher-order-thought theory. My arguments were all independent of that.

But the higher-order thought (if my theory of consciousness is correct, and there are higher-order thoughts) can have a causal role—what it's causal role is needs to be investigated.

How could a state's being conscious have causal influence but no utility? It's being conscious could be responsible for causing other mental occurrences—but ones that are not especially beneficial to the organism.

Carey YL Huh 6 July 2012 13:48
It's too bad Dr. Rosenthal did not have time to talk about hypnosis. That would have been interesting.

David Rosenthal 8 July 2012 04:52
Here's what I could have said if I had not skipped my slide on hypnosis:

- An example of executive function that is not conscious may well occur in hypnosis.
- Actions performed under post-hypnotic suggestion involve no awareness of an intention to perform them, and no conscious sense of their being voluntary (Hilgard 1977; Spans 1986; Oakley 1999).
- Subjects are unaware of planning these actions often require (Hilgard 1977; Sheehan and McConkey 1982; Spans 1986; Oakley 1999).
- Zoltan Dienes and Josef Perner (2007) explain all this as executive function that occurs without suitable HDTs: Hypnosis results in nonconscious executive function.

Do have a look at the Dienes-Perner article:

Carey YL Huh 9 July 2012 19:58
Thank you Dr. Rosenthal.
It is interesting though, that Dr. Raz's opinion on hypnosis at his talk today clearly was that of the hypnosis being an hyper-attentive state that is fully conscious. They may be unaware of some sensory stimuli that are physically present when they are told that they don't exist but they are completely conscious of what they are doing and feeling/seeing.

David Rosenthal 10 July 2012 04:41
I'm sorry I missed that talk. But I think the issue about hypnosis is not whether subjects are consciously aware of what they're doing, feeling, and seeing, but whether they're consciously aware of the hypnotically induced volitions as a result of which they're doing those things. In typical action based on post-hypnotic suggestions, subjects are unaware of volitions that have been formed from instructions given under hypnosis if under hypnosis they've been given the instruction not to recall that...
they were given the volition-forming instructions.

Bernard J Baars 6 July 2012 15:43
Dear David,

Isn't the proper answer to your question an enactive one, such as, "Huh?"

That said, if the question is asked using contrastive analysis --- meaning essentially the experimental method applied to consciousness as a variable --- the answers simply leap out. That is also true for any other biological adaptation --- does walking have any utility? When compared to the various kinds of paralysis of the legs, the answers fairly leap out, within a Darwinian framework.

This kind of analysis becomes non-trivial whenever there is a genuine empirical mystery --- what is the Darwinian function of serotonin? etc. What is the function of spontaneous empathy in infant-mother bonding? And so on.

You will argue no doubt that subjectivity is different from other neurobiological functions. It is in the sense I argued with Stevan who posed the Qualia Quiddity early on. Here's the answer I think will work, though it needs a little more work (the specifics for some consciously perceived dimension of variation).

I think the key to Qualia actually lies in the interaction of the observing executive ego of the prefrontal cortex (with links to parietal egocentric maps, for example) with allocentric (other-attributed) sensory input. Conscious objects of experience, like coffee cups in personal personal space require the interaction of those two systems, the ego/context hierarchy and input that requires some adaptive processing from that system.

In my 1988 book (which everyone should have memorized by now) I argue that observing ego functions are coextensive with contextual frames for qualitative experiences, and that the actual conscious experience of red objects involves reduction of degrees of freedom within the contextual color system as well as the egocentric/allocentric spatial maps.

What makes subjective qualia different from mere conjunctions of features is the interaction of the extended ego-frame system (the context hierarchy of my 1988 book) with unpredictable input. That's why you need the information reduction, a kind of Piagetian accommodation along the dimensions of subjective experience (e.g., psychophysical dimensions). In a sense all input that is experienced as subjective shakes up the entire dominant context hierarchy. In current neuroscience jargon, it requires "updating."

I have not developed this idea beyond the 1988 chapters on context, but it should be fairly straightforward to do so.

Maybe the time is ripe to do that now.

David Rosenthal 8 July 2012 05:17
Dear Bernie,

Not sure I get your enactive joke. I think that's a real question here, and people do take different sides on the question, even if my side is in a distinct minority.

But two comments about that. Most researchers who "say" they're studying consciousness, are not studying anything that has to do with whether or why mental states states sometimes do occur consciously. They're studying only that aspect of mental functioning that consists in mental states resulting in our being conscious of thing.

One might hold--as Stevan and Nagel and Searle and others do--that one won't be conscious or aware of things except by virtue of being in mental states that are conscious states. But that's a substantive thesis; it doesn't simply, as you seem to suggest, go "without saying." And I am arguing that this substantive thesis is not true.

Onto other points.

If by constrative analysis you mean compare cases when mental functioning is conscious with those in which it isn't, that's simply not good science--at least if we want to understand what the "role" of the states' being conscious is. It might be, as I argued explicitly in my talk and in my Neuropsychologia article, that in the cases in which mental functioning does occur consciously, their being conscious is not itself playing any particularly useful role. It might be that the utility and the states' being conscious are "independent", "joint" effects of a single process. That possibility must be ruled out.

In addition, it increasingly emerges from a very great deal of experimental work--much cited by Hakwan in his talk Saturday morning--that mental functioning that typically occurs consciously (or in any case subjectively seems to--which is no evidence at all), sometimes occurs without being conscious. So things are a very great deal more complicated than your appeal to contrastive analysis suggests.

And, no, I don't think the case of conscious qualitative mentality is different from other cases.

Finally, about the executive ego, there is ample evidence that it also functions without any relevant "conscious" mental states.
David Rosenthal said that the occurrence of consciousness did not rely on its beneficial properties but rather on something else, am I correct? But can we really say so? If a trait keep occurring through evolution, isn’t it because it has, at some point, some beneficial properties?

Marjorie Morin  8 July 2012 03:52
I agree with that Pauline! If we didn’t need consciousness to attend to our mental state to survive/to be more adapted to our environment, it would surely have disappeared throughout the years. But I’m still puzzled by the study where they showed that we make better consumer decisions without consciousness and that consciousness can have a nuisance effect on the decision. How can that be? I know we do solve some problems while we are not attending to it (like when you search for a name and stop thinking about it and then it pop back), but taking a consumer choice? Dr. Rosenthal could you give us the reference to this article?

David Rosenthal  8 July 2012 10:22
Several things. (1) The fact that mental states are conscious does not by itself show that their being conscious has anything at all to do with evolution. It could be that all that evolved was the capacity for mental states to be conscious, and developmental factors lead in each individual to their being conscious. One can’t simply assume that mental states’ being conscious is like having two arms and two legs—simply part of the genetic endowment. It could be like walk: Our genetic endowment is to have the capacity, and we come to be able to exercise that capacity.

(2) Evolution conserves; things rarely get dropped. So if something evolved by accident—i.e., without any help from selection pressures, it’s very unlikely to disappear.

(3) We don’t yet know how much of the evolutionary process is due to natural selection and how much to how the DNA tends on its own to change, independent of its phenotypic effects. There’s strong evidence that some recombination of DNA strands are preferred over others; we don’t know—but simply “assume”—that mutation is really random; it may well not be. Assuming that evolution proceeds by natural selection is simply black-box reasoning in the absence of any knowledge of internal mechanisms.

David Rosenthal  8 July 2012 10:23
About consumer choices:


This was criticized for methodological reasons in

Waroquier, L., Marchioni, D., Klein, O., & Cleeremans, A. 2010 Is it better to think unconsciously or to trust your first impression? a reassessment of unconscious thought theory. Social Psychological and Personality Science 1, 111-118.

but replicated without those methodological difficulties in


See also lots of work by John Bargh and colleagues.

Axel Cleeremans  11 July 2012 17:22
See also lots of work by John Bargh and colleagues.

Which we also failed to replicate in Doyen S, Klein O, Pichon C-L, Cleeremans A (2012) Behavioral Priming: It’s All in the Mind, but Whose Mind? PLoS ONE 7(1)
http://www.plosone.org/article/info%3Adoi%2F10.1371%2Fjournal.pone.0029081

I for one, even though I am convinced there are indeed lots of unconscious influences on behavior, have become convinced that most of this evidence is very problematic. Claims by Hawn for instance that one can do mental arithmetic without consciousness are very much overblown in my view. What happens is that (perhaps) you get very small priming effects (a few ms) that last for a few hundred ms and only for certain over learned arithmetic facts such as 7x8 or 3x2. I’d be convinced if one could compute 63x78 without awareness... On the other hand, it can clearly be done as any pocket calculator readily demonstrates. But this is no proof that in humans, it can be done without awareness.

David Rosenthal  12 July 2012 04:22
There are several issues here.

(1) I might agree that the mehy in Dijksterhuis et al and Bargh et al is not the best; but failing to replicate just raises the question of whether one can replicate some other way.

For example,


but

arguably more or less succeeded. We may succeed yet.

(2) I don't, by the way, find myself able to do that computation, in my head: I need paper and pencil. Are you suggesting that most people can do it in their head consciously but not without conscious awareness? That seems implausible.

(3) Even if multiplying 63 x 78 never occurs in humans without awareness, it need not be that that's because the relevant states' being conscious makes any contribution to the computational process that yields 4914 (I used a calculator) as the product. It could simply be the greater computational demand in such a calculation places on the mental processes result in greater neural signal strength for the computational processes, and that greater signal strength results in the states' being conscious. It need not be that the states' being conscious makes any contribution to the process that delivers the product. Cooccurrence is by itself no evidence whatever of causal role.

(4) You might reply, Axel, that it's the best evidence with have, at least right now. I'm arguing it's no evidence whatsoever without something additional that points to a causal role that the states' being conscious has in performing the calculational process.

(5) And there are theoretical reasons to think we won't find that causal role: The calculation process rests on the intentional content of the intentional states that figure in the calculation. We have experimental evidence from other cases that intentional content can occur without the relevant states' being conscious. Since intentional content occurs without consciousness, we have reason to suspect that consciousness plays no role in mental processes that rely on intentional content.

(6) Vis-à-vis Harnad's claims for nonconscious mental arithmetic: As Harnad himself points out, it's hard to get robust cases of any of these nonconscious processes, because robustness in the case yields, as I noted in (3), greater neural signal strength, which in turn tends to cause the states to be conscious.

(7) We can't simply dismiss this experimental and theoretical concern. If all that's happening in the conscious cases is that consciousness is coming along for the ride because of greater neural signal strength, we have no reason to conclude that consciousness plays any role whatsoever in the process. Failure to replicate doesn't address this; we need experimental findings designed to distinguish the possibility that consciousness does play some relevant causal role in the relevant mental process from the possibility that it doesn't.

Zoltan Dienes 12 July 2012 07:12
Hypnosis provides a valuable way of disentangling some of the confounds one often gets in consciousness research. In this case, consider Stevenson (1976). J. of Abnormal Psychology, who had people add 7 repeatedly to an initial two digit number, apparently unconsciously (i.e. the task was performed with automatic writing). People got 26 correct answers in a minute under these conditions (admittedly worse than the 31 correct performed consciously). You might ask: why should we believe subjects performed this task unconsciously? The general answer is that in lab conditions highly hypnotizable subjects pass a number of honesty checks (GSR lie detection methods, continued performance while they believe they are alone, relevant brain regions lighting up corresponding to their reports). These honesty-checking methods have not been applied to this particular case, so the matter is not closed. Nonetheless highly hypnotizable subjects (in lab - not stage - conditions) generally tend to prefer to openly fail tasks rather than mislead about their experiences.

David Rosenthal 13 July 2012 05:53
My very many thanks to Zoltan Dienes (a.k.a. "unknown" for this post. I think it's very illuminating. Hypnosis is an unusual condition, but it strongly and usefully supplements the strong evidence we have from other quarters, experimental, theoretical, and folk observational, for the occurrence of very rich, robust mental processing that isn't conscious.

Pauline Claude 16 July 2012 07:51
COMMENTS COPIED AND PASTED FROM THE CORRESPONDING POST ON FACEBOOK:
ANDY NDK:
"I would also advocate some benefit with consciousness, however at least it has been proven not be disadvantageous..."

Pierre Vadnais:
"If consciousness is necessary for, and co-evolved with, language, let's say it gets a free ride on language benefits."

David Rosenthal 16 July 2012 10:03
That's not really so: there is evidence, which I cited, that when mental states in reasoning are conscious, that interferes with reasoning success. E.g., Dijksterhuis and Usher: Similarly for work by et al on grammar learning--indeed, for so-called statistical learning altogether.

As for coevolving with language, I know of no evidence, and there's reason to think that that connection isn't reliable--if you're talking about a connection between language and the mental states that speech acts express being conscious states.

Pauline Claude 6 July 2012 18:40
David also mentioned that we didn't need to be conscious of a stimulus to be aware of that stimulus. But doesn't it contradict Stevan Harnad's view of consciousness who defines consciousness as being a synonym of awareness?

Noemi Stern 6 July 2012 19:14
Maybe I'm wrong, but I don't think that Prof. Harnad believes consciousness = awareness, necessarily. "Consciousness=feeling" and feeling is different from awareness (although they are often tied together lightly). You can be aware of the person sitting next to you, but you don't have to feel anything towards that person or feel anything as a result of them sitting next to you. My understanding of feeling is more congruent with emotion. Awareness could lead to feeling or come together with feeling, but they are not necessarily synonymous.

Stevan Harnad 7 July 2012 04:23
DISTINGUISHING IDENTICALS

Being conscious of (or that) X = being aware of (or that) X = feeling (or feeling-that) X. Those who try to give "awareness" a distinct meaning from "consciousness" (in such notions as unconscious awareness, unconscious knowledge, unconscious perception) are merely talking about the unconscious (unfelt) detection or possession or processing of information (data). But although my brain may detect, possess or process data without my being conscious of it, it is equally true that I am not aware of it, and I do not feel it.
Best to stop trying to pry apart synonyms that are in any case weasel-words. Calling feeling “feeling” will never betray you, nor lead you into question-begging, irrelevance, empty semiosis or absurdity.

**Pierre Vadnais**  7 July 2012 20:21
So, you agree that there is something to be distinguished: unconscious detection (as in subliminal cues) is different from feeling. Both can lead to action.

On the other hand, it is not easy to reconcile your "there’s not even any way to make sure anyone but oneself feels" and your blind faith assertion "Because feeling matters (and it’s the only thing that matters.) And animals feel." You can’t eat your cake and have it too.

Actions can be produced consciously or unconsciously and we cannot make the difference. Why bet that animals’ actions are conscious and robots’ actions are not? Because animals are biological like us? Then your criterion is not consciousness, it is biology... and it should also apply to plants.

**David Rosenthal**  8 July 2012 10:24
Well, I do think my views and Stevan’s are not compatible! But that’s not by itself a reason to reject my views! (Nor, of course, by itself reason to reject his views.)

I distinguished three uses of the term ‘conscious’. People and other creatures are sometimes conscious; their thoughts, sensations, perceptions, and so forth, are sometimes conscious; and people and other creatures are sometimes conscious “of” things.

You can tell that these are three distinct uses because ‘not conscious’ in the three cases clearly applies to very different things: in the first case, people or creatures’ being asleep or comatose or anesthetized, and so forth; in the second, ‘not conscious’ applies to thoughts, desires, perceptions, and so forth of which the creature is wholly unaware (except possibly in a third-person way); and in the third case a creature’s being unaware of the thing in question.

In the third case, ‘conscious’ and ‘aware’ are the same.

But not in the second. In subliminal perception, e.g., we are aware of the stimulus; otherwise it couldn’t affect downstream psychological processing. But we aren’t “consciously” aware of it. Those two are distinct phenomena.

**David Rosenthal**  8 July 2012 10:25
I myself think ‘feel’ and felt’ and ‘feeling’ betray us very often. They apply equivocally to mental states of particular sorts—e.g., bodily sensations and emotions—and to mental states’ being conscious. One could have a theory—as I take it you do, Stevan—that being mental never comes apart from being conscious. But one could have a theory on which they do come apart, as I do. Being mental is having intentional or qualitative properties, and being conscious is being aware of a mental state in a way that is subjectively independent of inference or observation, i.e., subjectively unmediated.

**Pauline Claude**  16 July 2012 07:47
COMMENT COPIED AND PASTED FROM THE CORRESPONDING POST ON FACEBOOK :

Pierre Vadnais :
*Good to hear that this is what he said, I thought I had heard "possible to be conscious without being aware"... Patrick Haggard ‘s subliminal cue puts things in perspective, the signal is sensed but not identified. Sensing is sufficient for awareness, but not for consciousness. In that context, awareness is limited to receiving a signal without identifying it; i.e. getting the signal but not the semantic. If I remember well, Shimon Edelman presented the difference between raw vision and conscious vision. The first was strictly visual signals, the second was reduced to identified (named) object. Obviously, only humans can “name” objects. Signals are sufficient for sensorimotor reactions.

For animals, it is all subliminal cues. Once we have consciousness, it is very difficult to imagine how that can be. Refer to my poster: “Consciousness is knowing that perception is a representation of reality”.

I guess that means there is no “What” branch in non-human perception... Or that “What” branch is strictly limited to categorization without identification.”

Stevan Hamad :
*All David can mean is that we need not be conscious of stimulus (we need not feel it) for our brains to be able to detect it, and even respond to it.*

Pierre Vadnais :
*This means that animals do not have to be conscious of stimuli (need not feel them) to be able to respond... never. Only verbal reporting gives evidence that the stimulus has not only been sensed (ok detected) but consciously felt. And “Ouch!” by a worm is not verbal reporting, only your interpretation of whatever signal you were conscious of...*

Stevan Hamad :
*EPICYCLING AROUND THE PROBLEM: People need not feel stimuli, ever; and I can get a toy robot to do verbal reporting. All evidence of feeling is inferential and correlative mind-reading, whether verbal or nonverbal. The hard problem is to explain how and why we feel despite the fact that it looks as if there's no need for it, and there's not even any way to make sure anyone but oneself feels."

Frederic Simard :
*I wrote a post on the specific subject of consciousness vs. awareness, a few days ago, maybe you can look for it, but globally, from what I understand (and Pierre Vadnais is close to it). Subliminal priming, belong to awareness, while subject report of observation belong to consciousness... And I think consciousness should been seen as a subset of awareness (we are aware, before we are conscious)

The terminology leads to a lot of confusion and impairs argumentation. Relating together the different terms used thorough the conference, will definitely be part of my paper. (A striking example is the wiki definition of awareness: (...) to be conscious (...) )"

Stevan Hamad :
*Communication will not advance unless we drop synonyms (and strained efforts to distinguish them). Consciousness is identical to awareness. Only Humpty Dumpty can try them apart."

Frederic Simard :
*Lo! I’ll take that into account when redacting my paper. Although we have to recognize that several people, who presented during this conference, are using consciousness and awareness in a distinct manner and we need to think more in term of concepts than absolute word meaning in regard to these words and in the context of the present conference...*
above for thinking that this is a good way to describe things.

I did not, by the way, distinguish being conscious of things from being aware of them; I distinguished between consciously aware of things from being aware of them but not consciously.

Juliette Colinas  7 July 2012 04:28
My own experience leads me to agree with Dr. Rosenthal. After a little while of meditation practice I now am able to follow my thoughts most of the time while awake, and I am in fact a little shocked to see that I don't seem to have any control over them. Even what I previously thought was my rational thinking, now appears to me as sentences popping out of nowhere (a little scary even sometimes, since I guess that goes deep against the cultural perception of consciousness I have been brought up with). I can't help to think that consciousness is therefore perhaps more about what's available in your working memory than about anything else, perhaps what Dr. Baars in his comment describes as "the interaction of the observing executive ego of the prefrontal cortex with allocentric sensory input". I look forward to reading Dr. Rosenthal's paper on his explanation.

David Rosenthal  8 July 2012 10:26
Thanks for that.

Another presentation that might interest people:
section 3
and the presentation it was derived from,

David Rosenthal  7 July 2012 05:21
Thanks for all these comments.

I'll be very happy to reply these and any others when I'm back in NY--give me a day.

Best,

David

Morgan Smith  7 July 2012 07:58
Prof. Rosenthal,
During your talk, you briefly mentioned and abandoned the possibility of language/report for utility of consciousness. Could you elaborate your view on this and the broader concept of social interaction/communication? It seems strange to think of communication occurring as we know it without conscious awareness, thought, and interaction. Similarly, what is your stance on empathy, as related to consciousness, and could you be able to point me in the direction of any empirical evidence for/against either of these ideas?

Thanks!

David Rosenthal  8 July 2012 10:27
Two things. (1) There is relatively little communicative utility to saying that one thinks something over and above simply expressing that feeling. Thus there is relatively little communicative utility to saying that one thinks that it's raining (reporting one's thought) over simply "expressing" that thought--by simply saying that it's raining. Social communication is rarely if ever better served by saying that one thinks that such-and-such as against simply saying that such-and-such.

One might think that saying that one thinks that such-and-such involves a measure of hesitation or guardedness not present in simply saying that such-and-such. But hesitation can be conveyed by saying 'maybe' and the like.

It's not often noted that reporting a thought, by saying explicitly that one has that thought, is distinct from simply expressing that thought verbally, by saying something with the same content. But they obviously are distinct types of speech act, since the have distinct truth conditions. They seem alike because they have the same *use* conditions--i.e., the same conditions of appropriate utterance.

The foregoing considerations lead to an interesting consequence, which is (2). Saying that it's raining and that one thinks it's raining not only have the same conditions of appropriate utterance; it's second nature to us that they do. So anytime one say that it's raining, one might as readily have said that one thinks it's raining. Since we are habituated to say either one largely interchangeably, we're habituated, whenever one says that it's raining, to have thought thought that one thinks it's raining. And "that's" what make one aware of one's thought that it's raining "whenever" one says that it's raining.

So for creatures like us, who are thus habituated, whenever we say anything, the thought we thereby express is a conscious thought. So language and consciousness seem to go together.

But that's not magic; the foregoing considerations explain why they do go together--and it's the special case of creature who not only can talk and think about their own thoughts, but also are habituated to treat saying something and saying that one thinks that thing as interchangeable speech acts.

And though that interchangeability has some utility, the awareness of one's verbally expressed thoughts flows from that interchangeability does not.

See chapter 10 of my _Consciousness and Mind_, OUP 2005, for the full development of these considerations.

David Rosenthal  8 July 2012 11:21
Sorry; I skipped the question about empathy. But I guess I'd reply with a question to you: Are you simply assuming that empathy is invariably conscious? Empathy obviously has considerable utility, as was vivdly explained in Baron-Cohen's presentation. What is about empathy that requires that it occur consciously?

And even if it does for some reason occur consciously, why is its being conscious useful? Why wouldn't it serve the same useful purposes without being conscious--simply
by registering in psychologically efficacious ways what mental states others are in and looking forward to appropriate psychological and behavioral reactions to that on one's part.

And finally, even if it does always occur consciously, why should one assume that its occurring consciously is in any way related to its being useful? It could be that something about empathetic registration of others’ mental states and a resulting tendency to respond psychologically and behaviorally “causes” the empathetic realization to become conscious—without its becoming conscious being at all useful.

One can't trust one's subjective impressions about these things, since subjective impressions don't access mental occurrences that aren't conscious, and so can't compare them. And though subjectivity may suggest that one's mental states--of various sorts--are useful, it can't tell us that their being conscious is what's useful about them. It could be other aspects, such as their representational content and their causal propensity to cause other useful mental states and useful behavior.

**Diego Mendoza-Halliday** 27 July 2012 09:10

Rosenthal says that during subliminal perception, we are "unconsciously aware" of the stimulus. I think that's a very confusing way to describe what is happening. We have to be more specific than that, for example by saying that we are aware of the presence of a stimulus but unaware of the identity of the stimulus. We can be aware of a stimulus to different levels of detail: mere detection, or furthermore identification, etc. It makes no sense to say that we are "unconsciously aware" of something.

What I said was that we could distinguish between conscious perceiving, in which we're consciously aware of perceive things, and nonconscious or subliminal perceiving, in which we're aware of things but not consciously aware of them.

That we're aware of things subliminally is evident from the effect that the subliminal input has on our distinctively psychological processing.

The distinction between being consciously aware of something and being aware of it but not consciously is simply a useful way, employed frequently in the popular press and in scientific journals, to capture the difference between conscious and subliminal perceiving.

I agree of course that we perceive in very many degrees of detail; but that's true both of conscious perceiving and of subliminal perceiving. The two issues cut across one another.

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**Stevan Harnad** 5 August 2012 18:43

ON BEING UNAWARELY AWARE

I don't recall using the phrase 'unconsciously aware', and it's in any case nowhere on this blog, as a quick reveals, except in Diego's post (and now mine).

What I said was that we could distinguish between conscious perceiving, in which we're consciously aware of perceive things, and nonconscious or subliminal perceiving, in which we're aware of things but not consciously aware of them.

That's why I urge doing away with all the ambiguous words and weasel words and just call a spade a spade: `have conscious states, states of awareness, or mindful states is psychological--or psychical--or mental -- or not. What states we call "psychological" and "mental" is terminological, and matters of taste. What states we call "aware" is not.

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**David Rosenthal** 6 August 2012 04:45

I think the terminology isn't so important here; I think what matters is whether, when stimuli are presented subliminally and they affect an individual psychologically, the psychological effect is similar in relevant ways to the psychological effect when the perceiving is conscious. I've argued--and there is overwhelming evidence for this--that the answer is yes. Given that, we have overwhelming reason to regard the subliminal case as perceiving. And then there is no issue about terminology except how to describe that result.

Gluing 'felt' to perceiving is an optional terminological decision that distorts things, by discounting all the psychological similarities that obtain between that conscious and nonconscious cases. We can do greater justice to the situation by describing ourselves as being aware of the stimulus in the subliminal case--though not consciously aware, and being consciously aware of the stimulus when the perceiving itself is conscious.

In any case, we can't settle substantive questions about whether the subliminal case is relevantly similar to the conscious case by terminological fiat; we must ask how similar the two cases are psychologically.

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**Stevan Harnad** 6 August 2012 09:37

UNFELT AWARENESS?

The weasel-word here is "psychological":

(Today's) robots and teapots (and Zombies), I assume we agree, do not have psychological states. They just have states.

The next question is: do all cerebral states of entities that are able to feel -- whether they are felt states or not -- count as "psychological" (or "mental") states?

Perhaps that's just a terminological issue. Ditto for cerebral states that affect other cerebral states. Whether we call the cause-state or the effect-state "psychological" is up to us. A fortiori, if a cerebral state is unfelt, but it resembles a cerebral state that is felt, and is even a precursor cause-state or an influence on a later cerebral state that is felt, then we are free to call it "psychological" (or "mental") if so inclined.

But calling the precursor state "aware" when it's not felt, or not yet felt, is another story -- and it goes beyond the question of the arbitrariness of how we choose to use the word "mental" or "psychological" and approaches something closer to either an equivocation or a self-contradiction.

That's why I urge doing away with all the ambiguous words and weasel words and just call a spade a spade: '

What we are talking about when we refer to conscious states, states of awareness, or mindful states is felt states. If a state does not feel like anything to be in, it is not a state in which anyone is aware of anything.

(To detect or possess or process or respond to information [data] is not to be aware of the data, unless the detection or possession or processing or responding to the data is felt.)

**SUMMARY:** What states we call "psychological" and "mental" is terminological, and a matter of taste. What states we call "aware" is not.
I don't think 'psychological' is what Stevan calls a weasel world. There is a lot of science about psychological functioning, and a very great deal known about the states, some conscious but by no means all, that figure in psychological processes and functioning—i.e., the processes and functioning that constitute the distinctive subject matter of psychology.

I don't suppose it's unimaginable that teapots could be in states that figure in functioning and processes of the distinctive type studied by psychology; imagine animated teapots in a Disney film. But we expect that no real teapots are in states we would characterize as psychological because they aren't of the sort figure in the processes and functioning that psychology would study.

It simply does not cut nature at the joints to divide conscious states from the nonconscious states that figure in those processes and functioning; the appeal to what's felt may be of concern to some in philosophy, but does not do justice to the functioning of psychological beings.

But David, I'm not a philosopher.

And I'm not appealing to what's felt -- I'm just appealing for an explanation of how and why organisms feel, rather than just do.

Psychologism is no reply.

What does the quality consist in if it is not conscious? It's the mental property in virtue of which—in both conscious and subliminal cases—we distinguish perceptually among perceivable properties. See, e.g., my "How to Think about Mental Qualities." At https://wfs.gc.cuny.edu/DRosenthal/www/DR-Think-MQs.pdf. Who's enjoying the quality? Well, in the subliminal case, nobody is enjoying it consciously. But again, we can't settle substantive question about nonconscious qualities by stipulative pronouncements that mental qualities occur only when consciously enjoyed. (Is there nonconscious enjoyment? Of course; a nonconscious sensation could, though the individual is not aware of it, result in pleasure; the pleasure might be conscious and it might not be, but in either case it would affect the individual's psychological life in the way pleasure characteristically does.

I'm afraid I'm by now lost in this maze of mind-like alter-egos inside me, experiencing pleasures while I am deprived of them.

More parsimonious (and comprehensible) to assume that the only one in me that is capable of feeling pleasure (or feeling anything at all) is me, and that the unfelt goings-on inside my head are just goings-on, like the pace-maker that keeps my heart beating (or the teapot boiling) -- not feelings minus the feeler.

But let it's be clear: all states -- both felt and unfelt -- that are going on inside the head of the feeler have unfelt causes. So if I do feel pleasure, its neural causes are unfelt (otherwise I could read them off from my armchair and save neurobiologists a lot of hard work discovering what they are!). But unless a pleasure is actually being felt, there simply is no pleasure going on at all, period. At least not inside my head (assuming I am not suffering from multiple personality). That's not terminological. It's substantive, indeed logical. I have no idea what an unfelt "pleasure" could possibly mean. I certainly would not call the neural causes, now, of what might eventually generate a feeling of pleasure in an hour "unconscious pleasure", now, no matter how much they may resemble the neural state actually going on while pleasure is actually being felt.)

Nonconscious pleasure is simply any state that has the characteristic psychological effects of conscious pleasure apart from the individuals' being conscious of it.

Saying something is a logical matter is in effect saying it's terminological: There's nothing in logic, properly so called, to tell us one way or another here.

David, hand on heart, no matter how hard I try, I can't help feeling that a pleasure I never felt is a pleasure I never had, irrespective of any other "characteristic psychological effects" -- except if the effect is to make me feel, today, as if I had felt a pleasure, yesterday, in which case it's still not a pleasure I ever had or felt, it's just a false memory. (Nostalgia's sometimes like that...) And yes, this still strikes me as a logical matter (but perhaps it's an "analytic a posteriori" (if one goes in for such Kantian Koans...)
have pleasurable states that aren't conscious.

You say you don't understand what I'm talking about; you don't understand it "from a first-person point of view". But I'm saying that such states occur without always being accessed in a first-person way.

Stevan Harnad  6 August 2012 12:44

"3RD-PERSON PLEASURE"

A third person's pleasure sounds to me like someone else's pleasure, not mine, David. (And as far as I know, there are no other pleasure-seekers in my head but me!)

Let's forget the Kantian Koans (a bad joke): "Unfelt pleasures" only makes sense to me as pleasures un-had -- hence more like missed appointments than appointments met by some 3rd party...

David Rosenthal  6 August 2012 12:48

It's your pleasure, Stevan--nobody else's! Sorry you're not always aware of it, but it's yours nonetheless!

Stevan Harnad  6 August 2012 13:04

"3RD-PERSON PAIN"

Ah, wouldn't it be nice, then, if pain, too, were something one could "have" without feeling it...

(By, while we're on the subject: why does anything at all need to be felt?)

David Rosenthal  6 August 2012 13:41

I did have a lot of arguments in my talk that a mental state's being conscious "adds" no utility over the state's simply occurring nonconsciously!


And pains do occur without being conscious--and that's partly nice, but they have all the other noxious psychological effects.

Stevan Harnad  6 August 2012 13:53

"Noxious psychological effects" sounds like something you feel: That's normally what we call pain. Its antecedents may be the causes of the pain, but they're not the pain (not if they happened yesterday).

David Rosenthal  6 August 2012 14:51

I'm not talking about antecedents of consciously felt pain; I'm talking about state that have all the causal links to other psychological states and to inputs and outputs--except for not being conscious.

You keep taking my words--"noxious psychological effects"--to mean what you want them to; but that's not an argument.

Stevan Harnad  6 August 2012 15:46

UNFELT INJURIES VS. UNFELT PAINS

So I guess you did not mean that unfelt pains "have all the other noxious psychological effects" of pain, but rather that they have all the other negative psychological effects of pain.

What would those negative effects be? May I ask about a particular pain: The pain of a burn. Let's consider both cases:

Mine, the usual one: My right arm is burnt. I feel the pain of the burn. (The burn itself is not a pain, it's a tissue injury) and as a (negative) psychological effect I can't go to the party and I have to write with my left hand for a while.

Yours, the unusual one: My right arm is burnt. The pain occurs, but it is not felt by me. But I do eventually notice that my arm has a burn on it, so, as a (negative) psychological effect, I can't go to the party and I have to write with my left hand for a while.

Is that what you mean by my "having" a pain, along with all its other negative psychological effects, but without feeling the pain?

Because I would describe that as having an unfelt injury, along with all its other negative psychological consequences; not an unfelt pain.

David Rosenthal  7 August 2012 03:28

Hi Stevan,

I did say, and mean, that "pains do occur without being conscious--and that's partly nice, but they have all the other noxious psychological effects." N.B. 'other'. Not just negative; all the properties that don't consist in or depend on their being conscious.

I don't think the case you think is fair to what I'm talking about.

But why don't we agree to wrap this up? Let me let you have the last word, since you were the magnificent host at the magnificent 10-11-day Montréal event!
Yours,
David

Stevan Harnad  9 August 2012 05:23

"UNFELT PAIN = NOCICEPTIVE DOINGS, NOT PAIN"

Pity to wrap it up. That there's "unfelt pain" is certainly not a done deal! Lots more to be said and thought about. I suspect we're just dealing with done doings, when you refer to "other" effects.

There would be no hard problem if unfelt doings were all there was. Why some doings are felt is the problem the Summer Institute was all about.

Thanks for a stimulating presentation and discussion, David. I think we both agree that it looks as if anything that we can do consciously could be done unconsciously.

What's not explained yet is how and why, then, any of it is done consciously.

David Rosenthal  10 August 2012 07:18

Dear Stevan,

One last round, since I think your last post raises a crucial issue. I think the issue about whether what you want to call nonconscious nociceptive doings should be called, as I think, nonconscious pains may not be as interesting as what the difference is between those states and conscious pains. As you know, I think a higher-order theory of consciousness can explain the difference. No state is conscious if the individual is wholly unaware of being in that state; so, by contraposition, some type of higher-order awareness is what makes the difference between a state's being conscious and its not being conscious. And that's independent of what terminology one wants to apply to the nonconscious states.

Stevan Harnad  10 August 2012 15:51

HERMENEUTICAL HIERARCHIES

I completely agree that the profound difference is the difference between unfelt doings and felt doings.

But I can't help repeating that "aware" is a weasel-word (and "wholly" is a bit of a fudge too!): A system that detects an optical input, and acts on it, is not "aware" of anything. It is just acting (doing).

It is only aware of an optical input if it feels like something to detect the optical input.

I think the "higher-order" hierarchy is just hermeneutical. Either the system feels or it doesn't. And if it feels, some of its functions are felt and some of them aren't. The unfelt ones are eo ipso unaware and unconscious doings. And the ones that are felt are felt, whether they are 0-order or Nth-order (feeling that you feel that you feel that you feel...).

But remove the feeling, and what you have left is nothing but doings.

Mark Balaguer    : A Scientifically Reputable Version of Indeterministic Libertarian Free Will

Mark Balaguer  A Scientifically Reputable Version of Indeterministic Libertarian Free Will

Abstract: In this paper, I defend libertarianism (i.e., the view that humans have libertarian free will) against philosophical and scientific objections. The main philosophical objection is sometimes called the Mind argument, or the luck objection; in responding to this objection, I argue that there's a certain subset of our decisions that have the following property: if they are undetermined in the right way, then they are libertarian free. This conclusion turns the traditional Mind argument upside-down; if my argument is cogent, then it shows that the question of whether we possess libertarian free will reduces to an empirical question about whether certain of our decisions are undetermined in the right way. Finally, in the second half of the paper, I respond to a few scientific objections to libertarianism, arguing that we do not have any good empirical reasons to doubt the hypothesis that our decisions are undetermined in the right way. Now, it seems clear that we also don't have any good reason to believe this hypothesis, and so my overall conclusion is that the question of whether we possess libertarian free will is an open empirical question.


Comments invited

Posted by Stevan Harnad

46 comments:
So Haggard correlates the moment of consciousness with the moment of action selection, which seems compatible with Balaguer's view that the moment of choice is free, not pre-primed. That is, they feel less in control of the decision if they choose the unprimed arrow, and they feel more in control if they choose the primed arrow.

Emma Cusumano presented today doesn't apply to them. A 49 choices of B. If, on the other hand, the person was talking about SITUATION 1, then again, this isn't a torn decision; it's a "leaning decision", and so the theory I want to say that it's close enough; decisions like this aren't FULL-BLOWN L-free, but they're for-all-practical-purposes L-free. (In the discussion period, someone said "If the two tied-for-best options being chosen (given the complete past and all the laws) are .51 and .49. In this situation, the choice isn't PERFECTLY TDW-undetermined. But I want to say that it's close enough; decisions like this aren't FULL-BLOWN L-free, but they're for-all-practical-purposes L-free. (In the discussion period, someone said "If the probabilities are .51 for A and .49 for B, then the choice will be B." If this person had SITUATION 2 in mind, then this is a mistake. What it MEANS to say that the objective probabilities are .51 and .49 is that there is some real indeterminacy there. So in this case, if we ran the decision 100 times, we should expect to get (roughly) 51 choices of A and 49 choices of B. If, on the other hand, the person was talking about SITUATION 1, then again, this isn't a torn decision; it's a "leaning decision", and so the theory I presented today doesn't apply to them.)

If we find ourselves in a TDW undetermined decisional process, or in a .51-.49 situation, will we have authorship in the decision or will the decisional process wait until the variable context gives it sufficient reason to decide.

Prof. Balaguer appears (I emphasize "appears" as I may understand him wrong) to consider TDW undetermined decisional processes in a static framework outside of any temporal dimension, which may validate his view. However, considering it within a temporal framework, with all the variability that exists in informational inputs, might render the authorship solution unnecessary.

There is some ambiguity in what is meant by a "51-49 situation"...

SITUATION 1: The person is consciously leaning toward one of the options—say, A—but hasn't fully decided yet. This isn't a torn decision. We can call it a "leaning decision". I think decisions like this can be L-free, but I didn't talk about this today, and the argument is different. Today, I was only talking about torn decisions—i.e., decisions where the person feels completely torn and isn't leaning one way or the other.

SITUATION 2: The person is making a torn decision—so the "phenomenological probabilities" are .5 and .5—but the actual objective moment-of-choice probabilities of the two tied-for-best options being chosen (given the complete past and all the laws) are .51 and .49. In this situation, the choice isn't PERFECTLY TDW-undetermined. But I want to say that it's close enough; decisions like this aren't FULL-BLOWN L-free, but they're for-all-practical-purposes L-free. (In the discussion period, someone said "If the probabilities are .51 for A and .49 for B, then the choice will be B." If this person had SITUATION 2 in mind, then this is a mistake. What it MEANS to say that the objective probabilities are .51 and .49 is that there is some real indeterminacy there. So in this case, if we ran the decision 100 times, we should expect to get (roughly) 51 choices of A and 49 choices of B. If, on the other hand, the person was talking about SITUATION 1, then again, this isn't a torn decision; it's a "leaning decision", and so the theory I presented today doesn't apply to them.)

Are Haggard's findings compatible with Balaguer's theory? (Are they even relevant to one another?)

In Haggard's paradigm that includes a free choice condition, people choose either direction (right or left) but they feel differently about each choice depending on whether or not it was primed. That is, they feel less in control of the decision if they choose the unprimed arrow, and they feel more in control if they choose the primed arrow.

So Haggard correlates the moment of consciousness with the moment of action selection, which seems compatible with Balaguer's view that the moment of choice is free, but Haggard's findings about sense of control hint otherwise. …

If I'm thinking of the same Haggard study that you're thinking of, then I would say that (a) yes, the results are perfectly compatible with what I said, and (b) they're not entirely relevant, because the choices in question aren't really torn decisions.

It's clear that Dr. Balaguer believes that there is a neural substrate of all of these choices, and he is not suggesting that some sort of dualistic agent is making our torn, wholly-undetermined decisions for us. So, I expect he would support the statement that these ambiguous or undetermined choices (meaning, choices that are not pre-determined at the moment of choice presentation) are governed by context, pre-existing connectivity and activity of our neural networks, and a stochastic element of neural activity (existence and utility this stochastic element illustrated yesterday by Bjorn Brembs).

Under this scenario, L-freedom (of which a requisite is non-randomness) need not exist. When one is presented with two probabilistically-equal choices are presented, the inherent stochastic activity will ultimately lead to the choice. The Libet experiments (and many follow-ups) suggest that the conscious sense of agency in...
I am really impressed about the human obsession of free will. Maybe because in my case the problem is solved in thinking that free will exist as soon as there is no emotional stream that can affect our decision making at that point. I was wandering what professor Blaguer has to say concerning emotion in decision making. Because even in a torn situation, the instant before this torn situation there is an emotional tension or feelings that push us towards one option. I don't see the point of invoking quantum physics in a discussion about free will, because even if at the micro particles level there is a kind of indeterminism, it doesn't make us free. Here, Epicurus had the same problem: if atoms (or electrons) move in an indeterministic way, this have nothing to do with the fact that our actions are the results of our thoughts or reason.

Mark Balaguer  6 July 2012 14:50
See the above comment about SITUATION 1 and SITUATION 2. If you're talking about SITUATION 2, then I agree that an exact 50-50 state of affairs is unlikely, but it also isn't needed on the view I've got in mind. And if you're talking about SITUATION 1, then this isn't a torn decision at all; it's a "leaning decision", and so it's not really relevant to what I was talking about today.

As for whether this says anything about us, all I can say is that I routinely make decisions while feeling torn. So it says something about me.

Alexandre B. Romano  6 July 2012 09:35
I don't see the point of invoking quantum physics in a discussion about free will, because even if at the micro particles level there is a kind of indeterminism, it doesn't make us free. Here, Epicurus had the same problem: if atoms (or electrons) move in an indeterministic way, this have nothing to do with the fact that our actions are the results of our thoughts or reason.

Mathieu Charest  6 July 2012 13:17
I think that emotions are obviously causally relevant to how we choose. In fact, they can be relevant to putting us into torn situations and pulling us out of them. That's fine with me. But then when you are actually making a torn decision, in the actual moment of choice, if you feel torn when you choose, there is a question whether your emotional state caused you to choose A over B without your realizing it. If so, that would undermine the L-freedom in the choice. But the first scenario, in which emotions play a causal role in putting us into a torn state, that wouldn't undermine L-freedom. And this is true of lots of other things that can play causal roles in the genesis of our reasons for action and our torn states.

Mark Balaguer  6 July 2012 14:23
The point is as follows. A torn decision is a neural event, and a neural event (like every other macro-level event) is a bunch of quantum events. So it is extremely plausible to suppose that if all quantum events are determined, then all torn decisions are determined and, hence, we have no L-freedom. But if some quantum events are undetermined, then it opens the POSSIBILITY that torn decisions are undetermined. A neural event could be undetermined if it is composed of a bunch of quantum events some of which are undetermined. And in my view, it is an open empirical question whether this is in fact the case. So I do not think that quantum indeterminacy entails that we are free. Rather, I think it is a necessary but not sufficient ingredient for L-freedom. And the point of most of the paper was to argue that undetermined events aren't necessarily random in the bad sense.
I don't think I agree with this point. In fact if no machine can explain your choice maybe it's because the whole universe forces are really too complicated for us to build the machine that could act like us, and there is always the "random issue" in that if this machine did exist, maybe it wouldn't choose like us because some random factor make it choose otherwise.

Marie-Lou Joly 6 July 2012 12:14
Hypothétiquement, il peut y avoir des situations où il y aurait un TDW-undetermined... Mais en réalité, nous n'avons que des exemples où le choix du 50-50 n'existe pas. Il est vrai que je peux être dans une situation où j'aurais bien voulu prendre mon vélo et mon auto, que je pourrais choisir mon vélo un jour et mon auto un autre. Mais entendons-nous, il faut ce choix en fonction d'un ou plusieurs facteurs. Comment peut-on conclure que le libertarianisme existe dans notre monde, si on se base sur des théories qui ne concerne pas notre réalité, avec toute la complexité que cela implique. C.Q.F.D.

Carey YL Huh 6 July 2012 13:44
I found Dr. Balaguer's talk interesting. I am not sure though that the wholly undetermined free state truly exists in decision making. I subscribe to the view, much like many neurobiologists I suspect, that our actions/choices are the result of neural firings and by the time the neural outcome has happened, the computation has already been done for us and the odds are already no longer 50/50.

Mark Balaguer 6 July 2012 14:27
I would actually take this one step further. On my view, we shouldn't just say that a choice is the RESULT of neural firings; rather, we should say that a choice IS a bunch of neural firings. It is a physical event. The question is whether the physical event--i.e., the event that is both a bunch of neural firings and also a conscious choice--is undetermined in the way that would make them L-free.

Guillaume Loignon 6 July 2012 19:49
Pasting a comment I made on Twitter. Let's look at the 50-50 thought experiment upside down.

If you had freewill, you COULD choose the 49% possibility. So the 50-50 thought experiment does not make much sense.

Marc Balaguer 6 July 2012 20:49
If you can't choose the cake that is rated at 49% (even if it is not that good) and just have to choose the 51%, then you do not have freedom of the will. Free will would not make sense if I only worked in perfect Buridan's Donkey situations - which never occur in real life anyway. Free will should allow to knowingly select the suboptimal possibility, otherwise your decisions can be explained (and predicted) by simple heuristics.

Pauline Claude 6 July 2012 18:57
Guessing on the function of (an illusion) free will - consciousness allows to improve the attribution of a biological value (whether or not it is beneficial for the organism) to the things that are attented. Free will is no more than paying attention to the decisions we have to make. By having an illusionary free will (which is conscious), we can have an emotional feedback on the result of our choices and then increase the ability to give a biological value to a certain behavioral choice by emphasizing the consequence of our actions in our fitness.

Guillaume Loignon 6 July 2012 19:49
Free will tend to happen at the phenomenological level. I don't have access to objective probabilities, but it is I that is supposed to have free will.

Mark Balaguer 7 July 2012 05:34
Again, there is need for clarity about what we mean by the 51-49 scenario. In your comment, you seem to have in mind the case where the phenomenological FEEL is 51-49. If so, this is not a torn decision, and so my talk wasn't about these decisions. (I talk about this in my book, though: the bottom line is that libertarians can take either of two lines--they can say either that in such cases, we will choose the 51 option or that the objective probabilities match the phenomenological ones; if either of these were true, it would be consistent with libertarianism.) But the more important point I want to make here is this: use say that a 50-50 choice can't happen. But if we're talking about 50-50 phenomenology here, this case most certainly CAN happen. Indeed, we know that it happens very often. Every time you choose while feeling completely torn, this is what's going on. When I say that a torn decision is one that involves a 50-50 phenomenology, all I mean is that the person feels utterly torn. This obviously can and does happen.

Now, I admit that it's unlikely to have the OBJECTIVE probabilities be exactly even, but again (see remarks above), the libertarian doesn't NEED it to be EXACTLY 50-50. She can let it be 51-49; and this most certainly won't decide it for the 51 case, because to say that the objective probability of an event occurring is .51 is NOT to say that it WILL happen. It's to say that it's 51% likely that it will happen. Given this, we should expect it to happen roughly 51 times in 100 trials.

Guillaume Loignon 7 July 2012 07:04
Free will tend to happen at the phenomenological level. I don't have access to objective probabilities, but it is I that is supposed to have free will.

Mark Balaguer 7 July 2012 10:15
But on my view, it is an empirical question whether you have free will. You don't have subjective access to the answer to this question. If the objective probabilities aren't what they need to be for L-freedom, then you don't have L-freedom, even if it feels to you that you do.

Juliette Colinas 7 July 2012 04:09
I find this all quite interesting though it's hard for me to follow most of it. Until I get a chance to try to understand more precisely, one, perhaps relevant, question : Dr. Balaguer, does the view that you have of consciousness matter in this discussion? (And you might have said what yours is but I didn't get it). It seems to me that the argumentation follows differently depending on whether one sees consciousness as a distinct emergent "entity", with potentially a power to feedback on the very processes that generated it, or not. If I am in possession of a faculty that can watch my thoughts and have an influence of them, it could well be that the decisions that my faculty will make will be a computable (or non-computable but still determined) outcome of my biology and history, but it remains that I have this faculty, this will. But if I believe that I do not have this faculty, I cannot say that there is something in me that has a power over what goes on in my mind. In other words, is what matters the most the question of whether the will is free, or whether there is a will to start with?
Hi Juliette. This is a really good question. No, I do not hold an emergent view of consciousness. But I do hold a token-token identity view of mental states and events. So mental states and events ARE neural states and events. And given this, conscious states and events can influence my behavior for the simple reason that neural states and events can influence my behavior and conscious states and events ARE neural states and events.

Mark Balaguér 7 July 2012 05:38

Free Will is often seen as necessary to attribute moral responsibility to someone. In the sort of free will you will defend there seem to be no better reasons to choose either O or P. In this framework, I don't see how one could attribute moral responsibility to a being and not to a machine randomly selecting O or P. What is the difference?

Vincent LeBlanc 7 July 2012 08:04

Again, I probably wouldn't care enough to resist this way of thinking of things. That if a quantum event is a PART of a macro-level event that I control, then I control the quantum event. But if someone really wanted to endorse (c) and reject (b), then it seems to me that the argument in (a)-(d) is flawed because either (b) or (c) is false. Once again, my intuition is that it's best to reject (c) and to claim that if a subatomic particle is a PART of a macro-level object that I own, then I own that subatomic particle (WHILE it's a part of the relevant macro-level object); but if someone really wanted to endorse (iii) and reject (ii), I don't think I'd care enough to resist.

Mark Balaguér 7 July 2012 10:17

But, in my view, a nonconscious machine that randomly selects O over P won't have L-freedom or any other sort of free will. So it won't have moral responsibility. Free will requires consciousness on the view I have in mind.

Gregg Caruso 9 July 2012 12:37

Interesting talk. The video unfortunately cut out when you explained how your view differs from Kane's—I wish I would have caught that section. Since I am more familiar with Kane's theory, let me couch my concerns in terms of his theory and hope that it also applies to your account of TDW or torn decisions. To help make my problem more vivid, I would like to introduce a case where the quantum indeterminacy is located outside the agent (although everything else remains the same as Kane's familiar example). Let's suppose that Louis is a middle-aged man who is currently looking down because he is concentrating on a chessboard. To get his mind off things he decides to spend the afternoon making a doghouse for his companion Philo. Louis takes out his power tools and gets to work cutting the necessary pieces. Now, in the process of cutting the wood Louis is overcome with a strong urge to harm himself. Perhaps he thinks this is a good way to get back at his ex. In this situation, Louis desires both to cut the wood so as to finish Philo's doghouse and to injure himself. Perhaps we can even say he is torn in your sense of the term. If this is not a good example of a torn decision I imagine an analogous example could easily be created. An inner struggle ensues and Louis is confronted with an important life choice. He is, at that very moment, undecided. Now let's imagine that in the process of cutting the wood a random quantum event causes the blade to jump, cutting off two of his fingers. Did Louis "freely cause" his injuries? Did he "decide" or "make" this event happen? In no way can we say that Louis caused or controlled the outcome since no one causes or controls quantum events! Hence, it would be counterintuitive to call this a free act. Yet Kane cannot explain why the example of the businesswoman is an example of libertarian freedom while this is not. Even though the outcome is indeterminate—as it was in the businesswoman case—it is nonetheless backed by reasons since each of the competing courses of action is something Louis wanted to do. Whatever the outcome, Louis would have succeeded in doing what he was trying to do because he was simultaneously trying to cut the wood and harm himself. According to Kane's theory, the felt indeterminacy and reasons backing of deliberative outcomes is necessary and sufficient for control. The Louis example satisfies both of these conditions. Louis, clearly in the throes of a soul-searching moment, experiences uncertainty and inner tension. He is conflicted by his competing desires and feels as though branching paths are metaphysically open before him. Phenomenologically, then, he satisfies the first condition—felt indeterminacy. He also satisfies the second condition because he has reasons backing either outcome. Whatever happens, Louis wanted it to happen... (part two coming)

Gregg Caruso 9 July 2012 12:42

Kane, of course, is likely to argue that such "external" or "accidental" indeterminacies are irrelevant and that what is needed is a correspondence between experienced indeterminacy and micro-level indeterminacy at the neural level. It's unclear, however, why indeterminacy at the neural level is required for this correspondence! Kane's proposal requires only a correspondence between experienced (or phenomenological) uncertainty and "the opening of a window of opportunity that temporarily screens off complete determination by influences of the past." This correspondence, I maintain, is met in my example. What difference does it make that the (posited) quantum indeterminacy is located at the neural level and not, say, the micro-level of the saw blade? The uniqueness of Kane's theory (and I believe your account) comes in locating the indeterminacy at a crucial temporal moment in the deliberative process—i.e., at the moment when one is confronted with a SFA or torn decision and is uncertain about what to do. It is the temporal location of the indeterminacy that matters, not its spatial location. It might be scientifically relevant where the libertarian posts the required indeterminacy—since, empirically, certain hypotheses will be more plausible than others—but philosophically it's irrelevant where the indeterminacy occurs. As long as the phenomenological indeterminacy experienced during the deliberative process is accompanied by metaphysical indeterminacy, and there are reasons backing the alternative outcomes, both of Kane's singly necessary and jointly sufficient conditions for control are satisfied.

How would you respond to such an objection? I'm basically granting the phenomenology of a torn decision AND real indeterminacy, yet arguing that control is not preserved.

Mark Balaguér 10 July 2012 06:31

Hi Juliette. This is a good question. I actually discuss an objection similar to this in my book. Let me first make sure that a certain feature of my view is clear: on my view, the relevant indeterminacy has to be located (i.e., temporally located) at the moment of choice. Near the end of your remarks, you say that I locate the indeterminacy at the moment that the person is confronted with the choice. That's not right. You could be confronted with a choice, and then deliberate for a while, or wait for a while, or whatever. On my view, the indeterminacy has to be located at the moment that the person chooses, not when the person is confronted with the choice.

Given this, let me make sure I've got your worry right. I think it's this: (1) in the Louis case, i.e., the case in which the relevant indeterminacy is located at the moment of choice, the decision is at the moment temporally located AT the moment of choice. The near end of your remarks, you say that I locate the indeterminacy at the moment that the person is confronted with the choice. That's not right. You could be confronted with a choice, and then deliberate for a while, or wait for a while, or whatever. On my view, the indeterminacy has to be located at the moment that the person chooses, not when the person is confronted with the choice.

If that's the argument, then my response is that (2) is false. The relevant difference is that in a TDW-undetermined torn decisions; therefore, (3) the decisions I've got in mind aren't authored or controlled by the agent or L-free.

If that's the argument, then my response is that (2) is false. The relevant difference is that in a TDW-undetermined torn decisions; therefore, (3) the decisions I've got in mind aren't authored or controlled by the agent or L-free.

I discuss an argument like this in my book. Imagine someone arguing as follows: (1) your car is made of subatomic particles; therefore, (2) in order for it to be the case that you own your car, it needs to be the case that you own the relevant subatomic particles; but (3) no one owns any subatomic particles; therefore (4) you don't own your car.

This argument is obviously not cogent. In particular, either (ii) or (iii) is false. I don't think it matters much which of them we say is false. My intuition is that it would be best to reject (iii) and to claim that if a subatomic particle is a part of a macro-level object that I own, then I own that subatomic particle (WHILE it's a part of the relevant macro-level object); but if someone really wanted to endorse (iii) and reject (ii), I don't think I'd care enough to resist.

Likewise, for the argument in (a)-(d). Given the arguments in my paper (i.e., the arguments for the claim that if our torn decisions are TDW-undetermined, then we author and control them), it seems to me that the argument in (a)-(d) is flawed because either (b) or (c) is false. Once again, my intuition is that it's best to reject (c) and to claim that if a quantum event is a part of a macro-level event that I control, then I control the quantum event. But if someone really wanted to endorse (c) and reject (b), then again, I probably wouldn't care enough to resist this way of thinking of things.
Hi Mark. Thanks for the thoughtful reply and for clarifying the temporal point of indeterminacy. You do accurately represent my concern but I am not convinced by your reply. You claim that the relevant difference between the Louis case and an authentic case is that in the Louis case the decision is causally undetermined while in the authentic case the decision is not. However, I am not convinced that this is the right way to think about the case. I think that the relevant difference is between the case where the decision is causally determined and the case where it is not. In the Louis case, the decision is causally determined because the agent has control over the outcome. In the authentic case, the decision is not causally determined because the agent does not have control over the outcome. So, I think that the relevant difference is between the case where the agent has control over the outcome and the case where they do not. This is not the same as the case where the decision is causally determined and the case where it is not.

Hi Gregg. Thanks for the thoughtful reply and for clarifying the temporal point of indeterminacy. You do accurately represent my concern but I am not convinced by your reply. You claim that the relevant difference between the Louis case and an authentic case is that in the Louis case the decision is causally undetermined while in the authentic case the decision is not. However, I am not convinced that this is the right way to think about the case. I think that the relevant difference is between the case where the decision is causally determined and the case where it is not. In the Louis case, the decision is causally determined because the agent has control over the outcome. In the authentic case, the decision is not causally determined because the agent does not have control over the outcome. So, I think that the relevant difference is between the case where the agent has control over the outcome and the case where they do not. This is not the same as the case where the decision is causally determined and the case where it is not.

Hi. Two points. First, you're right that we can't settle the question with a thought experiment. But by thinking things through, we can figure out one thing that will help when we can go examine the world empirically. In particular, we can motivate the claim that if our torn decisions are causally undetermined in the right way (with the right objective probabilities assigned to the various options and so on), THEN they are L-free. But of course, we still need to determined empirically whether these decisions really ARE undetermined in the right way. Second, I agree with you that unpredictability has nothing to do with free will. Coin tosses are unpredictable, but they are not free. Much more is required for freedom of choice.

Hi. Two points. First, you're right that we can't settle the question with a thought experiment. But by thinking things through, we can figure out one thing that will help when we can go examine the world empirically. In particular, we can motivate the claim that if our torn decisions are causally undetermined in the right way (with the right objective probabilities assigned to the various options and so on), THEN they are L-free. But of course, we still need to determined empirically whether these decisions really ARE undetermined in the right way. Second, I agree with you that unpredictability has nothing to do with free will. Coin tosses are unpredictable, but they are not free. Much more is required for freedom of choice.
Abstract: Is it possible for the mind to be blank? Conscious thought is central to human experience, and this centrality has led many to propose that the stream of consciousness is uninterrupted - that 'thought is without breach, crack, or division' (James, 1892). We propose that these presumptions of omnipresence are premature, and explore the phenomenon of 'mind-blanking,' a mental state defined by a lack of conscious thought. Using experimental evidence from several studies, we present the case that (1) mind-blanking is a distinct mental state, distinguishable from both stimulus-dependent thought and other stimulus-independent mental states such as mind-wandering; (2) mind-blanking is subject to ironic effects of mental control, such that attempts to suppress blanking result in more blanking than if suppression had never been attempted; and (3) mind-blanking is subject to ego depletion effects, such that ego-depleting activities result in higher incidences of blanking during a subsequent free thought period.

Blackmore, S. (2002) There is no stream of consciousness. Journal of Consciousness Studies, Volume 9, number 5-6 http://www.susanblackmore.co.uk/Articles/jcs02.htm

Comments invited

37 comments:

Ana Pesquita 6 July 2012 10:27
I am wondering about the relationship between mind-blanking states and motor performance. Athletes perform better when they are not attending to the biomechanics of movements they are performing (sorry can't find the reference for this now). So, what is it about mind-blank state that "seems" to allow for a more direct activation of motor implicit knowledge, or maybe just less inhibition? Anyone can point me out to literature on the neural correlates of mind-blanking? (guess i am not giving google scholar the right keywords)

Nico Sheppard-Jones 6 July 2012 11:23
Ana, I'm afraid I don't have (google) knowledge of the relevant literature. However, your comment makes me wonder about 'what counts' as mind-blanking. If I think of this on purely subjective terms, my intuitive understanding of mind-blanking is that it is a state in which the stream of consciousness (another expression that needs defining, perhaps) is interrupted, and in which this interruption is noticed solely upon a (rather intense) re-connect to conscious thought. In the case of high-performance athletic activity, the mind may well be devoid of tangible thought, but I would argue that the individual is highly focused - a state that I think differs significantly from what we conventionally understand as 'mind-blanking'. I would suggest that the difference between the highly focused state experienced during physical activity and 'normal' consciousness - or even, to make a stronger case, during a highly focused state experienced, say, during an exam - has a lot to do with the episodic memory requirements to execute the task at hand, but that ultimately, the two are conscious states, distinct from 'mind-blanking'.

Ana Pesquita 6 July 2012 13:18
Nico: Thanks...I see your points and I agree. These are potentially different states. It would be nice to have a more grasping definition of mind-blank.

Adrian Ward 6 July 2012 14:59
Hello!

Great comments here (and below).

Ana, what you're referring to is the state that is generally called "flow" (look up work by Csikszentmihalyi for a primer). Unfortunately, what he calls "flow" is so broad that it doesn't really mean much (for example, he counts both being "aware of nothing" and "extremely aware of everything" as being part of the flow state).

In terms of literature...there really isn't anything out there that looks at mind-blanking per se (the data I presented today are from the first paper that we're submitting, and we have two more in the pipeline - one distinguishing mind-blanking from other mental states, and the other showing the relationship between mind-blanking and ego depletion). Your best bet would be to look at Watts & Sharrock (1988, I believe) or some of the Descriptive Experience Sampling literature (mostly done by Heavey and Hurlburt).

In response to both Nico and Ana: I agree that a more precise definition of mind-blanking would be useful. When I talk to psychologists, I generally give a more clearly defined idea of the concept, but I intentionally backed off from that for this crowd because there are so many taxonomies of consciousness floating around out there.

In any event, my favorite current definition centers around the idea of "awareness of awareness." There's certainly something going on (we don't just fall over into comas); however, we're not aware of it - we might be aware, at some low level, of perceptual stimuli or other inputs - but we aren't aware of this awareness (either in the moment or after the fact (the "after the fact" part matters because it differentiates mind-blanking from mind-wandering - see Schooler (2002) for a discussion of awareness, meta-awareness, and mental time travel).

Thanks again for your great comments!
Marie-Lou Joly  6 July 2012 12:26
I first want to say that I really enjoy the study, especially the originality of the protocol. But I wonder what the term "mind blanking" means exactly. In the example given by Ward, I just don't see how the fear of speaking in public is similar to have a "black" moment. And also like an other person ask, a "loss", mind wandering moment. We fear to forget our text in the same way we fear to forget what we learned on front of an exam. But I wouldn't call it "mind blanking".

Adrian Ward  6 July 2012 15:02
Marie-Lou:
First, I TOTALLY agree with you re: fear of speaking in public. I honestly don't like that example, and only use it because people tend to connect with it (and enjoy the comparison to a fear of death). I think it might be an example of a FEAR of going blank, but the experience of going blank in public per se is probably very rarely an actual instance of mind-blanking (my intuition is that people are aware of the fact that they're "blank" - which means that they're thinking and, as a result, not actually blank). See above for my description of mind-blanking as "awareness of awareness," and let me know how that sits with you!

Marjorie Morin  8 July 2012 03:37
Thank you for this explanation! I was wondering about this example too! I think the explanation you did about the lack of awareness of awareness is clearer. You also said below that you "have research suggesting that we can't recall our mental states post-hoc if we were blank" which makes total sense and explain further that this example isn't a case of mind-blanking. I wonder if intense fear could create a mind-blanking episode? It might not be very adaptive since we have to react (fight or flight). But on the other end, we might be able to react even with mind-blanking...

Maxwell J. Ramstead  6 July 2012 13:03
IMHO, it may be interesting to experimentally contrast mind blanks with experiences of mindfulness. Mindfulness practices such as meditation have been explored by recent neuroscience work and have been linked to such mental events as consciousness and attention. Perhaps comparing and contrasting the dynamics of both kinds of states might yield interesting insights.

Romain Vincent  6 July 2012 14:28
Comparing mind blanking and mindfulness is really interesting, but what about hypnosis? Does our thoughts under hypnosis have any content?

Shady Rahayel  6 July 2012 17:08
They might sure have. I think it's the main basis for hypnotherapists to investigate "anchored thoughts from childhood", for whoever dares believing in their validity.

Bruce Anderson  6 July 2012 18:27
There are several states that can be called "mind blanking".
For example:
* the total focus of an olympic athlete on their (individual) performance. Conscious thoughts are too slow and are distracting, hence peak performance is only achieved by blanking them.
* when you are tired or distracted or confused and simply "zone out" for a short while. It is likely that consciousness in this state is actually quite similar to that of the athlete.
* when you empty your conscious mind of all internal dialog and images. This can easily happen in hypnotic trance and meditation. Typically, you have awareness that there was a period of time of which you were un-aware (but only afterwards).
* and probably others.
To distinguish and study these, subjects could be hypnotized and trained, in trance, to display unconscious ideomotor responses (e.g. finger lifts) when their UNCONSCIOUS is aware that the conscious mind has blanked. It should be possible to distinguish between types of mind-blank in this way. Any moderately competent hypnotist could guide subjects to consistent and comparable responses and this would avoid the contamination of requiring the conscious mind to report when it is shut off.
@RomainVincent - thoughts under hypnosis most definitely have content, and are usually much more vivid and focused that thoughts under normal consciousness. Whether the subject remembers them on return to normal consciousness is usually dependent on the suggestions that the hypnotist gives. It is common that, without explicit instructions to remember, the subject just loses track of all that went on.

Adrian Ward  6 July 2012 21:14
Hey Bruce!
Thanks again for your ideas re: meditation. I like the idea that meditation allows you to get around the problem of asking people to consciously report about the lack of conscious awareness. If we can train people to report about their mental states without having to engage meta-consciousness (which necessarily requires thought), then we can open up the possibility of having people report the blank mind in-the-moment (as opposed to after they notice it has passed (as in self-caught self-report studies) or after we FORCE them to notice that they are in that state (as in probe-caught self-report studies).

Adele Tufford  6 July 2012 13:11
First, on a metaphysical note, I am confused about how blank blank is. If we assume consciousness (on a low level) is all-or-none, I do not see how, if we are still online (ie not comatose), this flow could be disrupted (and not just because I never see the fridge light OFF). So if nothing is nothing, then nothing must be something, is blanking
A famous example is the Ganzfeld effect. Stimulus-dependent. A famous example is the Ganzfeld effect.

Good observations, Dr. Ward. I think I've discussed such phenomena in my 1988 and 1997 books, in connection with "Redundancy Effects." They occur predictably with repeated stimulation past the point of "satiation". (But satiation is an explanatory construct that is probably wrong, since mind-blanking in those situations is highly stimulus-dependent). A famous example is the Ganzfeld effect.

I also think blanking could mean many things and there could be different levels of "empty" states of mind. As this could be difficult to define, I suspect it won't be easy to pin this state down experimentally as well. I would like to commend Dr. Ward on his attempt!

I don't know if we can assume that consciousness is all-or-none - that's why I drew the distinction between transitive and intransitive states of consciousness, and mentioned that I would be focusing not on whether or not people were capable of awareness (e.g., being alive v. being dead), but on what they were aware OF (e.g., a thought, a sensation).

Your comments about blanking being something we can't access in terms of our mentalese seem closer to the idea - as mentioned in comments above, I'm closing in on talking about mind-blanking in terms of "awareness of awareness" - we may be minimally aware of something at the moment, but we are not aware of that awareness (either in this moment, or after the fact).

Your comments about being able to recall an experience after the moment of blanking actually wouldn't fit under my definition of blanking (and I have research suggesting that we can't recall our mental states post-hoc if we were blank). This is actually one of the big differences between mind-blanking and mind-wandering without awareness (a state in which consciousness is active, but meta-consciousness is not (see Schooler, 2002)). When people are mind-wandering without awareness, they can perform "mental time travel" and report their prior mental states - even though they weren't meta-consciously aware of them at the time. When we ask people to do the same thing after they report being blank, they are unable to do so. This also leads to the idea of blanking as a lack of awareness of awareness - even if you are aware of something at a very low level, you are unaware of awareness and, as a result, unable to report on mental states experienced while you are blank.

In terms of describing blanking to people in downtown Boston, everyone received the same definition, and we asked them to explain it back to us. People who couldn't were excused from the study. It's not a perfect control, but we did make an effort to ensure that everyone understood the concept.

Finally, I don't think I ever said anything about it being impossible to distinguish between day-dreaming and blanking other than by subjective report (except for possibly in the d-prime/computer study). In all other studies, people completed "free thought" tasks - basically, all we asked them to do was daydream. A report of mind-blanking during this task couldn't be confused with a report of daydreaming (or mind-wandering), because the first state is off-task and the second is on-task.

Thanks for the great comments!

I also think mind-blanking could mean many things and there could be different levels of "empty" states of mind. As this could be difficult to define, I suspect it won't be easy to pin this state down experimentally as well. I would like to commend Dr. Ward on his attempt!

I agree that mind-blanking is a slippery beast, and agree that there could be different degrees of "emptiness." No one has ever studied mind-blanking per se, and we're definitely just at the beginning stages - but each new study gets us closer!

Another important thing is that I don't think we have to argue for mind-blanking being a state that represents 0% consciousness. I'm interested in a lot of blanking-related phenomena, but one potential use of pinning down the blank mind is using it as a tool to compare behavior/experience in the blank state v. in a non-blank state. To do this, we don't need to compare 0% to 100% - all we need is a relative difference, so we could find interesting results even if we were really just comparing 25% to 75% (obviously those number are made up, but I'm sure you get the idea).

Thanks!

It can't be an easy thing to pin down (if it's possible at all!). I think it's very smart that without necessarily pinning it down, you looked at how each person's subjective experience of this state can be modulated by varying other factors, such as intention to blank or not to blank out, the level of distraction from the environment and as well as alcohol in our bloodstream! I would be curious though, how the brain looks when we are trying to blank out (thus not succeed) vs. when we blank out naturally (of course, all in gradations).

I wonder if there are any external manifestations of mind-blanking (like the gaze, or something). It could be interesting to record these signs by eye-tracking...

Hey Romain Vincent! My collaborator (Dan Wegner) and I actually had plans to do an eye tracking study, but we got beat to the punch by some people in the mind-wandering camp...there's a paper on eye-movements during reading while wandering.

That's not to say that a mind-blanking/eye tracking study wouldn't be interesting - it just got pushed back on the priorities list.

However, we're still interested in exploring psychophysiological correlates of mind-blanking (e.g., skin conductance, EEG).

Thanks!

Good observations, Dr. Ward. I think I've discussed such phenomena in my 1988 and 1997 books, in connection with "Redundancy Effects." They occur predictably with repeated stimulation past the point of "satiation". (But satiation is an explanatory construct that is probably wrong, since mind-blanking in those situations is highly stimulus-dependent). A famous example is the Ganzfeld effect.
In the contemplative traditions it is known by a variety of names, most spectacularly "pure consciousness," defined in the Vedanta tradition as "consciousness without contents." Mantra meditation gives rise to such experiences, as do many other contemplative techniques.

There are many empirical studies on mind-blanking in those traditions, searchable under "meditation effects" in PubMed.gov. In the TM series on these effects they were strongly associated with spontaneous breath cessations without compensatory overbreathing. I have experienced these effects numerous times (they are not very spectacular, they just happen), and so have large numbers of people who have practiced mantra meditation.

The point about no compensatory overbreathing is that momentary breath cessation is quite different from "holding one's breath" in diving, for example. After a long dive, we spontaneously feel the need to breath deeply until the O2/C02 balance comes back to normal in the bloodstream. The absence of overbreathing after spontaneous breath cessation in mantra meditation indicates there is no oxygen lack, and therefore no homeostatic re-balancing. Physiologically that is a very powerful piece of evidence for a genuine decrease in metabolic demand.

So it's a very interesting, easily established phenomenon that millions of mantra meditators have noticed. The fact that the early reports have NOT been replicated in published form is a major failure of normal scientific method. Replication in these cases is always mandatory. For this reason there is still doubt about what must be obvious and trivial to millions of people. In proper science this failure to replicate should be scandalous --- like failing to replicate Newton's prism experiment, for example. It's easy as heck to do.

The taboo against studying consciousness is part of the problem, and there is an additional burden of taboo against studying unusual states of consciousness. Completely unscientific.

In any case, yes, there are blank periods of consciousness, as William James described so beautifully. Jonathan Schooler has done important empirical studies of the similar phenomenon of absent-minded reading, which we all experience as well.

BJB

Juliette Colinaz 7 July 2012 03:45
Dear Dr. Baars,

it warms my heart so much to read that you are also outraged by the lack of interest in the meditative state on the part of western research.

I am very puzzled by this. Eastern cultures know and practice meditation (and blanking of the mind) for millennia, yet here we barely even start to acknowledge even that we can experience such a state. Wha's your idea for the origin of this difference? I was wondering if it could be due to the fact that meditative states have been in the west perhaps practiced to some extent but always associated to prayer in the context of the religious practice - and therefore, from the start assumed to be irrelevant for science. And could that also be part of the origin of the "taboo against consciousness" that you mention? My question is probably a bit naive, but I don't know the history surrounding this...

Adrian Ward 7 July 2012 09:40
Excellent comments, Dr. Baars, and greatly appreciated!

I agree that it's a shame that Western research has largely ignored the idea of a "blank mind." I think you're right that it's probably due to the taboo against consciousness research, as well as an unfortunate Western tendency to discount Eastern thought/experience (which, as you said, has been explored, documented, and researched for quite some time). Hopefully this trend will change, and my personal belief (and hope) is that putting some of the observations of the East into the terminology/methodology of the West will help; it's a shame that this may be the best route - but I think it's better than the alternative of leaving wide swaths of the varieties of conscious experience unexplored.

One question re: mantra meditation. As I understand it, this form of meditation consists of repeating phrases (i.e., mantras) repeatedly. Is there a time when these mantras essentially fade into the background, leaving the individual with something like pure consciousness? I've personally had a bit of trouble with finding the correct way to connect mind-blanking with meditation. One problem with meditation was a focus on some low-level stimulus - e.g., a flame, the sound of a gong, one's own breathing or bloodflow. These types of meditation (and most with which I'm familiar) seem to be reducing the scope of conscious awareness and reducing it to low levels of activity, but my wonder at what point (if any) they might cross over into a state where the mind is devoid of awareness altogether (or at least devoid of the "awareness of awareness").

Again, thanks SO much for your comments - the best feedback is always that which leads us closer to the truth, and you've certainly provided some food for thought (and a renewed desire to connect our (admittedly Westernized) version of "mind-blanking" with Eastern schools of thought).

And - although sometimes it's hard to be honest without seeming like you're sucking up - let me just say that many of your papers/books have been instrumental in helping me construct my personal views of conscious/conscious awareness - so thank you for that, as well.

Best,
Adrian Ward

Pier-Éric Chamberland 1 August 2012 04:20
Dear Professor Ward and Professor Baars, reading your comments raised some questions and I would like to read your opinion on the following, please.

I have issues understanding what is the link between mind-blanking and meditative states/flow experiences, apart from the fact that they are both states where consciousness is "free or light in content". This might have been said elsewhere, but I understood from Mr Ward's presentation that mind-blanking it rather involuntary and undesirable (i.e. repeating oneself NOT to go blank at a public speaking)

Meditative states and flow experiences appear to be on the other side of the spectrum, being rather voluntary and desirable (efficient, present-centered mindsets attained through repeating a mantra or a thought or mentally rehearsing an action — sounds like implementation intentions to me). Mark Lear (Duke University, NC) designate these states as "hypo-egoic self-regulation", in which conscious thoughts conflicting with action of action (i.e. self-defeating emotions or temptations) are silenced, thus fostering flow experience and reducing self-regulatory expenditure (Leary & Guadagno, 2011 - Also see his chapter in the Handbook of Self and Identity, 2012).

On the energy expenditure level, Mind-blanking occurs more often in ego-depleted states (low mental energy, impaired and slow decision making, you know this), while meditative states / flow experience / hypo-egoic self-regulation preserve self-regulatory energy and prevents ego-depletion. Also, on way to attain the latter is by using implementation intentions (mental repetitions), which also spares self-regulatory energy on the long run.

On the contrary, Mind-Blanking happens when one repeats to himself NOT to go blank. (Personally, I find doing this a silly idea, because focussing on something else (or repeating focused toughest) would help better and might even help to attain a meditative/flow/hypo-egoic state).

In brief, the only way I see a link between mind-blanking and meditative/flow/hypo-egoic states is that they are on opposite side of the same spectrum. They would be on the same level, and mind-blanking would be an involuntary state of content-free mind in the ABSENCE of goal-conflicting behaviours that guide functioning while on that state, or as a COUNTERPRODUCTIVE consequence of the accumulation of goal-conflicting thoughts resulting in an dysfunctional free-of-content mind.
Do you agree with this? Is it something that was said before? Do you consider doing experiments with goal-directed behaviour where you contrast the two states?

thank you!

Pauline Claude 6 July 2012 19:35
Here is a bunch of questions/comments I had when listening to Adrian Ward’s talk:

1) As described by Adrian Ward, mind blanking is a mental state completely free of content. But having a mental state without any content isn’t a content itself for the brain? and then if the brain can interpret mind blanking as a stimulus, is there a function of mind blanking? might the function of mind blanking be to temporarily reset the brain in mentally unsolvable situations, a bit as when we faint because the body is too threatened?

2) Does the fact that mind blanking seems to be under control would be an adaptive function?

3) When we have mind blanking, aren’t we attending to our mind blanking? in other words, is that really a completely thought-free mental state?

Pauline Claude 16 July 2012 07:25
COMMENTS COPIED AND PASTED FROM THE CORRESPONDING POST ON FACEBOOK:

Pierre Boucher:
"I was extremely intrigued by his talk and asked him similar questions after his talk. To answer your third question first, we only become aware of mind blanking after it has occurred. Otherwise it would not be mind blanking, as you would have contents, or the metaawareness that your mind is blank and he says that this does not fit his definition for mind blanking."

Pierre Boucher:
"You answer your second question as part of your first comment. As for the first question, yes the the mental state of mind blanking is content for the brain, but the state is not content for it self, so the mind is still blank."

Pauline Claude:
"But does mind blanking have an unconscious meaning for the brain?"

Pierre Boucher:
"That is a good question. I have no intuition on that, but probably"

Pauline Claude:
"If I go with my intuition, a complete absence of stimuli is itself a stimulus for the brain. Organisms evolved to respond to a continuous reception of stimuli. It might be very disturbing to suddenly stop perceiving any single thing and so, it should rise an alarm to say "hey! that's not normal, what's going on?" you have to do something to go back to normal!"

Juliette Colinas 7 July 2012 02:53
Dr. Ward, I enjoyed the talk very much, thank you. Do you have any intention (and would it be a good idea anyway) to study and compare mind blanking in people who practice meditation regularly? Would they have more control over it?

Adrian Ward 7 July 2012 09:46
Juliette-

Great question! My intuition is that they certainly would. One place to read about some of the amazing effects of meditation is in the work of Katherine MacLean. For example:

http://pss.sagepub.com/content/early/2010/05/11/0956797610371339.abstract

She finds that experienced meditators seem to have greater mental/cognitive/conscious control across the board - even in completely novel tasks. For example, people who have gone through an intensive meditative retreat are much better at a simple line discrimination task (which they've never seen before) than those who have not. She also addresses potential confounds (particularly, the possibility that meditation isn't causing the difference, but that people who are motivated to practice meditation are simply different than those who aren't) by using another group of meditators as her control group - this control group was scheduled to take the retreat after the initial group, so she had the ability to test two groups who were matched on their tendency to seek out meditative experiences, with the only difference being that one group had completed the retreat and the other had not.

There's more out there, but that's a personal favorite of mine - especially because it speaks directly to the ideas of conscious control and awareness.

Alexandre Duval 7 July 2012 07:02
Great talk, I am wondering: has there been any empirical study of people who have much less frequent states mind-blanking than other people? I am asking because that might be a good way of determining if mind-blanking plays a fundamental role in our cognitive economy. And what that role might be. For instance, in the case of inner speech, some empirical studies have shown that schizophrenic people are less involved in inner speech on a daily basis.

Adrian Ward 7 July 2012 09:53
Alexandre-

Good question.

To my knowledge, the answer is "no" - at least not by people who use terms related to the blank mind, the lack of consciousness, etc. We certainly find individual differences in our own research, but haven't connected these differences to behavioral outcomes. We have a few sets of relevant results, though - for example:

-The effect of mind-blanking on reading comprehension (paper in preparation): Incidence of blanking is uncorrelated with comprehension (whereas incidence of mind-wandering is negatively correlated with comprehension). I think this mostly shows that there's something different going on between blanking and wandering, not necessarily that blanking is or isn't related to the ideas behind CE.

-Ego-depletion effects on mind-blanking (paper in preparation): people display more mind-blanking after an ego-depleting task than after a less-depleting task. This suggests that consciousness requires energy, and blanking may be a way of conserving that energy. I think this speaks more directly to the energy/outcome ideas behind CE - however, this only covers the energy part (and not the outcomes).

Hope that helps!
Roxane Campeau 23 July 2012 13:13
Great talk and all this discussion is truly interesting!
With the paper in preparation about the link between ego-depletion effects on mind-blanking, I'm wondering if there is a relation to seek out with multiple personalities pathology. I mean, if we do more mind-blanking after an ego-depleting task, may be it is adaptive in a way that we can "escape" ego-depletion experience when it is too hard to be aware of it. Could it be plausible then that, if we are too oftenly exposed to ego-depletion, we could fall more and more into mind-blanking state, without being aware of it? And so on, could it eventually leads to multiple personalities pathology?

Martha Shiell 8 July 2012 11:01
Is there any connection between mind-blanking and the symptom of "petit-mal"absence seizures?

Roberto Gulli 26 July 2012 19:27
This is something I was wondering as well, and I was really surprised to see it go unmentioned in the talk. Given the difficulty in controlling the subjects in the experiments described by Dr. Ward, a physiological correlate of these blanking states would add much to the studies, so the experimenters are not left to simply trust that the subjects are doing as instructed (that is, an objective measure to ensure that the subjects are truly "blanking out" and not just paying attention to something other than the task in front of them). Petit mal seizures have a very distinct EEG trace. Dr. Ward, is a similar trace evident in during the mind blanking you describe?

Adrian Ward 28 July 2012 12:28
Hi Roberto (and also Martha)!
We've considered connections to petit mal seizures, but haven't been able to do any psychophys work yet (we have IRB approval for it, but it's a matter of lining up priorities). I agree that it would be extremely useful to find a physiological correlate of mind-blanking, and hope to do that down the road - but right now we're starting at the only place we can...the beginning. Taking a phenomenological approach, and building a program of multiple behavioral/self-report studies so we can - at a minimum - get an idea of how to get a handle on a mental state that FEELS different from other mental states (specifically, one that feels "blank" - both in the moment and after-the-fact).

So...to answer your question: we don't know...yet. But I would be surprised if a state that has such distinct phenomenological and behavioral correlates (even from mind-wandering without awareness, which might be the most closely-related mental state) doesn't also have a distinct physiological signature.

Izabo Deschenes 30 July 2012 20:46
I also really enjoyed this talk! I was wondering, is 'mind blanking' in the sense of not thinking of anything the same thing as not remembering something, such as blanking in public speaking or forgetting where one put their keys or walking into a room and not remembering why we came into that room? Surely there is a difference between a blank mind in the context of meditation vs. 'going blank' in front of an audience.
In the case of forgetting where we put our keys, I remember one of my professors saying that we are not in fact forgetting where we put our keys, but the memory was never made/consolidated in the first place. I was then wondering if someone could expand on the relationship, if any, between mind blanking and memory and the extent to which they could be related.

Jennifer Robinson 31 July 2012 07:29
I am curious if there is any relationship to age and the frequency of mind-blanking. I remember in one of the studies, the mean age was 22 years. Has there been any comparison between different age populations?

Xavier Déry 31 July 2012 11:43
Ward meta-quotes William James, does that count as TWO references to William James? I think we're up to a good dozen occurrences

SUMMARY & DISCUSSION, DAY VII

VII. Doing Things Because You Feel Like It (Friday July 6)
Gary Comstock (NCSU) Feeling Matters
David Rosenthal (CUNY Grad) Does Consciousness Have any Utility?
Mark Rangan (Cal State) A Scientifically Reputable Version of Indeterministic Libertarian Free Will
Adrian Ward (Harvard) Mind Blanking: When the Stream of Consciousness Runs Dry

SUMMARY & DISCUSSION, DAY VII
Comments invited

Posted by Stevan Harnad at 09:44

9 comments:

Pauline Claude 6 July 2012 19:03
Why consciousness in animals has to be a criterion in ethics?

Stevan Harnad 6 July 2012 19:58
Why does anything matter in ethics? Because feeling matters (and it's the only thing that matters.) And animals feel.
Shady Rahayel  7 July 2012 06:53
My impression is that without consciousness, we wouldn't be respecting animals. The fact that they feel, i.e., that they suffer, is really the reason for which we have ethical laws towards animals.

Take a look at environment: if we were to prove that trees feel pain, we probably would also vote laws to protect trees, and we wouldn't be cutting them down everywhere. Ethics is just giving us a reason to respect animals; I don't think we would be ethical in treating animals if it wasn't about consciousness.

Pauline Claude  16 July 2012 07:37
COMMENTS COPIED AND PASTED FORM THE CORRESPONDING POST ON FACEBOOK:

Stevan Hamad
* "Why does anything matter in ethics? Because feeling matters (and it's the only thing that matters.) And animals feel.*

Pauline Claude
* "Feelings matter to us because we are able think about them. Yes feelings matter for animal since it drives their behavior but isn't it anthropomorphizing a bit too much the idea of feelings that animals have?"*

Stevan Hamad :
* "Pauline, what is all this abstract theorizing? It hurts animals if you kick them. So you should not kick them. Is there some sort of theoretical problem with that?
(Feelings matter because they matter to feelers: not just to the kickers, but to the kickees.*)"

Pauline Claude
* I have troubles to put my mind into words. Let me think about a nice way to write it down and I'll come to you later on that.*

LOUIS CHARTLAND :
* "I can try. Sure, I have empathy, which makes some things conscious and worthy of consideration to me (both at the same time). But what if it's flawed, or dead wrong? How do I evaluate the judgment empathy makes?"

Stevan Hamad :
* "Louis: Your empathy does not make the sparrow feel; nor does it make the sparrow's feelings worthy of consideration. And the consequences of your empathy being wrong matter far less (in fact, not at all, for a feelingless sparrow-leapout) than the consequences of its being not-wrong (for the feeling sparrow: think of Pascal's Wager). http://fr.wikipedia.org/wiki/Part_de_Pascal*"

LOUIS CHARTLAND :
* "Actually, this is much more compelling than Pascal's Wager, because the intuitions are much stronger. In fact, I thoroughly enjoy your rejoinder.
As does Pascal, though, you're presenting us with extreme alternatives. You could accomodate the constraints of these intuitions without giving value in virtue of feeling. For instance, some sort of care ethics focus on the value of the care relationship for the carer. Organisms to which we attribute feeling also seem to be those with which we feel we can have a care relationship. And that might be more in line with the way we actually infer feeling on animals."

Pauline Claude :
* @ Stevan : as promised, I come back to you on your second comment. After listening Marthe's talk, I think I can easily explain you what I meant. As Marthe pointed out, we are able to infer that animals (especially mammals) do feel their feelings as we do because they share some physical/behavioral similarities with us. But this is mere speculation because experience is subjective and can only be known by the individual who experienced it. But how can you be sure that animals are even conscious? you cannot rely on animal's behavioral similarities with humans because what you interpret as pain or any kind of feeling might be completely the result of unconscious processes exactly as a highly sophisticated robot would be able to behave as a human do."

Pauline Claude  16 July 2012 07:38
Stevan Hamad
* "SCIENCE, CERTAINTY AND SENSE*

Pauline, you are making a mistake. You are imagining that because one cannot know "for sure" that any other entity than oneself feels (the "other-minds" problem) it is therefore rational to conclude that animals do not feel until one has proof to the contrary.

First, verbal report is not proof to the contrary in humans: it is just further behavioral evidence; same is true of neural correlates. So with neither of those can one be sure either.

Second, one cannot be sure about many facts that one nevertheless takes to be true: that apples will continue to fall down instead of up; that the "laws" of science are true; that the external world exists.

All those logical grounds for scepticism are there, in each case, but the rational conclusion, in each case, is not that therefore the fact is not true, but just that it is not certain.

In the case of animal suffering, there is the added factor of Pascal's Wager -- which is that if you make the mistake of taking the logical grounds for uncertainty as grounds for provisionally assuming falsity, then the consequences (for the animal) are incomparably worse than assuming truth. (It's rather like assuming "guilty until proven innocent" rather than "innocent until proven guilty.")

Empirical (i.e., "scientific") truth is a matter of probability, not certainty."

Pauline Claude :
* "Actually, I quite agree with what you said Stevan. I'm just trying to make sense of what has been said on consciousness so far, and the result is quite striking. We cannot use scientific evidence to justify ethical choices. They are only based on what we feel is the best as humans. And actually that's make some sense. Why do we have such complex thought abilities? why feeling you think matters? because it gives subjectivity and subjectivity allows you to go beyond the reality and because it allows you "buildind" your own reality in which your believes have to prime on what the reality actually is. That what ethics is, a belief construct that cannot be disturbed by scientific reasoning because a belief has to be subjective. So ethics has to base it premisses on moral reasons and not on scientific reasons.
I'll finish that if I would have made a mistake by using some sort of scientific evidence to discredit consciousness in ethics. I'll say that base arguments on the fact that it is scientifically proven than animals do have feeling cannot be use either. The adaptative function of subjectivity keep is "advantageousbility" only when it stay subjective. So, I'll say : science is dangerous game!"

Pauline Claude  16 July 2012 07:40
Stevan Hamad
* "Pauline, one did not need to go to the special case of feeling in animals to see that we "cannot use scientific evidence to justify ethical choices." Laws and ethics are not based on science. It is not "unsicientific" or contrary to "scientific" evidence to kill, rape or steal. And yes, animal welfare laws and ethics as well as human welfare laws and ethics are based on feelings."

Pauline Claude :
* "All I'm saying is that feelings and the fact of having consciousness cannot be used an argument to give animals rights, moral values can because this is how we feel as an individual in our subjective world that matter. After 8 days of seminar on consciousness, people manage to convince me that even plants might have
feelings, so how far should we go? Why according more importance to animals feelings than plants? The only feelings that really matter to us in ethics (and when I say “that matters to us” I don’t mean that it is necessarily a conscious process) is our subjective feelings we have toward animals. People first want to protect animals because they want to lower the pain they feel when thinking about their pain because they believe they feel pain. If in our subjective world we do believe that animals do have feelings, we have to stay logical with ourselves and protect them for that reason. But believing animals have feelings keeps being a belief. A belief is itself something that we think is true in the lack of any other evidence that prove us the contrary, but we cannot either prove that this belief is true, otherwise it’s not a belief anymore. However, I’m quite convinced that believing is quite adaptive, and what might also be adaptive is to keep hard believing until you have enough evidence to stop believing in it. So people are right to keep protecting animals because they have feelings (because it is actually what the evidences we have so far tend to demonstrate that animals might have feelings and that in the lack of any other evidence, we have to keep believing in that otherwise having a belief loses all its utility). I cannot make you stop believing that your belief that animals feel isn’t true, exactly as you cannot make me stop believing that feelings are not valuable in ethics and exactly as none of us will make stop a christian believing in God because neither you and I will have enough evidence to convince him that God doesn’t exist. It’s the exact same thing with consciousness. You’ll never be able to give me enough evidence that they actually feel despite the fact that I know that feelings are all a matter of subjectivity, exactly as I cannot be able to give you enough evidence that animals do not have feelings for the same reason.”

Pauline Claude 16 July 2012 07:40
Frederic Simard :
*Before being approved to work with monkeys, I had to read a text about the ethic of animal use in research and here are the main line of this text.

Problem, there are people that votes for no control over animal research (absolute mad scientist point of view) and people who votes for no research with animals (absolute Hippie position). Because we live in a society, we need to find a compromise.

First argument (pro), animal research leads to a great deal of progress, which results in saving human lives, without endangering more humans (human use in research, let’s say). - From a strict egoist gene theory interpretation, human are biased toward valuing human life more than animal life.

Second argument (against), because we are the prodigious boys of mother earth, we need to take care of our siblings, animals and plants. Plus, culturally, we know how much it’s sucks to be enslaved, abused, tortured and so on...

Solution, animals have been classified according to their ability to feel pain Monkey > Mouse > flies, and in order to diminish the total amount of felt pain by the animal kingdom, any scientist is required (morally) to try to use alternative to animal research (computational models, theoretical work, ...) or, if not possible, to use the animals that resides at lowest level of the scale, that can satisfy their research requirements. Moreover, and I know from research with monkeys, you also need to submit your protocol and justify any action or behavior that results in discomfort for the animal (surgeries for instance) and have it approved by the committee for ethical treatment of animal research (or something like that). For instance, in my lab, we cannot use any negative reinforcement, it is forbidden. We need to develop experiments involving only rewarding of the animal.

I hope it helps!

Gary Comstock 7 July 2012 13:05
Sorry I haven't responded sooner; my university mail settings apparently disallow us from joining Blogspot while using our university domain. I It took me this long to figure out the problem, which I trust I've now resolved (by creating a new gmail account.)

Thanks, btw, for these comments. I intend to respond to all of them, and soon.

Pauline Claude 7 July 2012 18:32
(I post my comment here because Saturday's discussion page has not created yet)

Emotions have been quite neglected so far in the different talks. However, as Luiz Pessoa showed, it seems to be quite central with the notion of feelings and consciousness. What is it to feel if not telling us that something "feels" good and has to be done again or that something "feels" bad and don't have to be done again. And what about memory? Also neglected so far. If no record of the feeling of the outcome is done, how consciousness can even exist?

Simon Baron-Cohen: Evolution of Empathy

Simon Baron-Cohen Evolution of Empathy

Abstract: Empathy is the drive to identify another person's thoughts and feelings and to respond to these with an appropriate emotion. Empathy comes by degrees, with individual differences evident in the traditional bell curve. We now know quite a lot about which parts of the brain are used when we empathize and how empathy develops in children. We also know that early experience affects empathy, but so does biology: hormones in the womb, and specific genes. There are several ways in which one can lose one's empathy, clearly seen in psychiatric conditions such as the personality disorders, including the psychopath. We discuss how people with autism and psychopaths show opposite empathy profiles. Finally, the discovery that there may be 'genes for empathy' implies that empathy may be the result of our evolution.

http://www.youtube.com/watch?v=An_tCTLGnFE


Comments invited

Posted by Stevan Harnad
empathize, once informed. Unlike sociopaths, though, it is not true that they get pleasure from someone else's pain. So, when told someone is hurt, even though they didn't perceive it, autists...
Claudia Polevoy    - UQAM

associated with a facial expression? Maybe that might only help them to «perceive» but not «feel»... but then like Dr Baron-Cohen said, when they know, they feel.

«systematize» the analysis of facial expressions (e.g., if the eyes are like X, than Y)? Will this be enough or would be missing the need for an emotional memory of empathy? For example, knowing that autistics have more difficulty with cognitive empathy but they have strong systematization capacities, would it be possible to

Since we observed a double dissociation between empathy in psychopaths and autistics, a question that comes to my mind is: it is possible to «teach» either component

Claudia Polevoy  

no "double dissociation").

Psychopaths have no trouble perceiving both. They just don't care (about causing negative emotions). So only "empathy" is only at issue with psychopaths. (There's

It seems to me it is not at all that autists have trouble perceiving thoughts and psychopaths have trouble perceiving emotions. Autists have trouble perceiving both. Psychopaths have no trouble perceiving both. They just don't care (about causing negative emotions). So only "empathy" is only at issue with psychopaths. (There's no "double dissociation").
S. Baron-Cohen presented several slides about the structural (anatomical) abnormalities found in the brain of those participants who participated to a simulated empathy task. Apart from the basic biases coming up from the tasks, I was wondering if those regions activated (limbic system, vmPFC, OFC), and that are thus considered less functioning or being impaired or reduced in size or reduced in their activation or whatever, would rather be the consequences of those genetic traits that would've altered during development the normal functioning of specific proteins. We put forward the impact of GABAergic receptors that could have a very much significant role in altering the neurodevelopmental process. How this relates to environmental impact, without any genetic predisposition, on the development of non-empathic behaviours, I don’t know though.

Klara Kovarski 7 July 2012 07:31
Thank you for your talk, I found it very interesting. Data show that it is possible to identify empathy attitude and behavior in monkeys. About this I was wondering if these results could be used to state that there is no correlation between empathy and language.

Shady Rahayel 7 July 2012 08:19
Are empathy and language automatically related to one another? I’m thinking about two deaf-mute people who would probably understand perfectly that the other is sad, without the language being the support of this interpretation.

Klara Kovarski 7 July 2012 10:32
In reality, deaf-mute people still possess sign-language, which is a way to formulate their thoughts in a more concrete way, using the hand gestures of ASL (or another sign language). In this way, the ‘sadness’ that they communicate would still be linked to the ‘sadness’ that exists in the sign language that they use. My comment was due to those theories of consciousness that implicate the purpose of speech.

Noemi Stern 7 July 2012 07:55
Evolutionarily, is it possible that empathy is a precursor for altruism?

Shady Rahayel 7 July 2012 08:17
I think so. It would otherwise be weird that altruism might have been present before and at the same time as empathy. I always think that altruism is determined because we obtain something from it. We help someone around us because he is part of our group, and he might help us in return. I identify someone who is sad and help him out because the presence of a sad person in the group would interfere with the group's functionality, etc.

Pauline Claude 7 July 2012 16:41
Actually if I would be tempted to say that empathy might be the precursor of altruism, some evidence tend to show that it isn’t the case. Empathy is an ability that need certain neural devices to be produced and arrived late in evolution. However only a few species have the ability of empathy whereas almost all living species display a certain level of altruism (even ants display altruistic behavior and they surely don’t have empathic abilities). Although some people argue that even mammals such as rodents may have empathy, I stay quite skeptical about that. Empathy is thought to be driven by the so-called mirror neurons. However, the mirror capacity of these neurons seems to be found only in a limited number of species. But I don’t know a lot about neural circuitry of empathy so I don’t want to mislead you. You should check the literature on empathy and mirror neurons for more details.

Shady Rahayel 7 July 2012 08:31
S. Baron-Cohen presented several slides about the structural (anatomical) abnormalities found in the brain of those participants who participated to a simulated empathy task. Apart from the basic biases coming up from the tasks, I was wondering if those regions activated (limbic system, vmPFC, OFC), and that are thus considered less functioning or being impaired or reduced in size or reduced in their activation or whatever, would rather be the consequences of those genetic traits that would’ve altered during development the normal functioning of specific proteins. We put forward the impact of GABAergic receptors that could have a very much significant role in altering the neurodevelopmental process. How this relates to environmental impact, without any genetic predisposition, on the development of non-empathic behaviours, I don’t know though.

Camelia 7 July 2012 14:13
Thank you for your talk. I have few questions for you, Dr. Baron-Cohen.

1) Can you explain more precisely in the case of autism, the relation between the three types of consciousness (of the physical world, of the mental states (of self) and of others) that you described? It is possible to say that all are interdependently related? And how?

2) About empathy in very young children, who are later diagnosed as autistic: Often, some parents didn’t observe anything wrong, because in the two first years of their life are social children, they have the smile, they try to speak, they have joint attention, and one day, all of this developmental signs disappear. Can we say that this pre-level of empathy development is stopped because autism is manifested? They have these abilities or not? It is a very problematic question because often the parents seem to think that their child was a normal child and one day, he became autistic. We know that sometimes, in video recording, we observed that these children manifested some autistic signs. But the question is important.

3) About the relation between cognitive and affective empathy: I agree with you that it is very different for autistic people and psychopaths, but I want to understand more about the affective empathy in autistic people? Can we say exactly that the affective empathy is intact, because they have really many difficulties with the expression of the emotions and also with the understanding. Emotions are they related only to cognitive empathy? or they are also and actually very strong related to affection? I remember some examples when one autistic child respond by laughing as reaction to his mother crying, because for him the tears look as something amusing. It is because that he didn’t have only cognitive empathy or is a little more complicated? Actually, is very difficult to separate these fields. But I agree with Dr. Cohen that these children have some affectivity that sometimes is very well manifested.

Thank you very much for your answers.
Camelia Dascalu (Paris 3 University)

Pauline Claude 7 July 2012 17:32
I really enjoyed Simon’s talk who brought the idea that empathy has social bases and the fact that he differentiated consciousness in terms of "what we are conscious of". Because I think that beyond the Hard problem of consciousness, we have, at some point or another, to address the evidence that consciousness has different levels, and that found in humans is another level that cannot be ignored just because of the Hard problem. Separating consciousness of the physical world and consciousness of our mental states is quite essential in my opinion even if some still argue that there is only one kind of consciousness.

Pauline Claude 7 July 2012 18:14
Simon talked a lot about social bases of empathy and how social factors can influence the level of empathy we display. He also added that although empathy is highly influenced by social factors, some biological factors play a role in the control of empathic behaviors.

However, as it has been pointed out by someone in the discussion session, Simon missed a really important process in the machinery of empathy (this mechanism is actually crucial in any kind of behavior), mainly epigenetic processes. For those who are not really familiar with epigenetics, epigenetics is the mechanism by which...
environmental factors, including social factors, can modify gene expression without modifying the DNA sequence. In fact, studies on epigenetics and behavior tend to demonstrate that the variability found in (human) behavior (e.g. variability in the level of empathy an individual is able to display) might only be the result of a variability in the environment rather than in variations at the genetic level. Epigenetics, actually explain why individuals who receive inappropriate care in their childhood (e.g. abuse, parental neglect, etc...) develop later mental disorders such as depression, personality disorders and so forth. These effects on the behavior has been shown to be directly socially triggered by epigenetic modifications leading to modification to the so-called "biological factors" that Simon mentioned. It is however true that psychopathologies have biological correlates but these biological correlates are correlates of social factors. Of course, sometimes, for some rare mental disorders, the cause is entirely genetic, but I'm talking here about quite common mental disorder such as depression and personality disorders. Looking for psychopathic genes (as Simon presented) cannot be successful as it is likely that the main factors leading to the development of a mental disorder relies mostly (if not only) on social factors. I also wanted to mentioned that we have to be really careful when using adoption studies (or any kind of genetically informed studies such as family studies or twin studies) to infer the genetic component involved in behavioral phenotypes. Epigenetics being quite recent, their effects has often been omitted in the results of such studies. In fact, epigenetic processes start accruing on the individual well before its birth and those epigenetic effects can easily be allocated to genetic factors. Actually, epigenetic factors can explain why two individuals living in the same family (and thus in quite similar environment) tend to display similar behaviors. That being said, epigenetic is the evidence that the hypothesis of a social theory of empathy is highly plausible.

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**Pauline Claude** 8 July 2012 17:08

**COMMENTS COPIED AND PASTED FROM THE CORRESPONDING POST ON FACEBOOK:**

Frederic Simard : "Even though his talk focused on the genetic precursor to empathy, Dr. Baron-Cohen did presented evidence that environment had a strong and additive influence, on top of genetic, over behavior. I do not think he intended to overlook all the facets of empathy, but rather that he intentionally focused on the genetic aspect of it, in order to fit his talk in the 50 mins format. However, I agree with your post and find it very insightful."

Pauline Claude : "I know, he probably didn't want to present all the facets of empathy. But if he presented genetics variations as being a factor of empathy, which seems to not be quite accurate according to the results of epigenetic studies. It's probably because he misses completely the epigenetic factor in its overall view of empathy. When you look at epigenetic studies, it seems quite striking that variation in behavior is only the result of variation in the environment (especially the social environment). Epigenetic effects are quite tricky because with genetically informed studies such as adoption studies (which he presented in his talk) they can be confused with genetic factors (which is actually the problem of most of these kinds of studies, because they generally don't take into account these epigenetics misleading effects)."

Frederic Simard : "I don't know about epigenetic studies, but if you are right (which I don't doubt of), you mark a strong point... Maybe indeed, the effect is not additive (A or B or A+B), but conjunctive (A and B)... And I do believe that environmental effect should exist through epigenetic... Good point!"

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**Carey YL Huh** 7 July 2012 22:38

Dear Dr. Baron-Cohen,

I wondered about the case of the autistic woman that designed better enclosures for cattle (her story was made into a movie with Claire Danes) based on her ability to understand the cow's perspective. Dr. Baron-Cohen painted a pretty simplified view on autism but I am curious how she would have the ability to empathize with animals if she could not do so with fellow humans?

I also am interested to know, given that the genes identified to play a role in empathy and they appear to be able to affect almost all neural circuits because they are involved in pretty basic functions like GABA transmission, what makes the 'empathy' circuits more vulnerable to disruptions?

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**Amos** 8 July 2012 13:59

Did you just look at qualitative aspects of empathy or did you also try, in your experiments, to quantify them?

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**Laurence Dumont** 31 July 2012 19:28

Dr. Baron-Cohen has developed scales of empathy that can be filled (and has been validated) by various populations. I encourage you to look at the research done with it, most of it is really interesting and the items (even if some are questionable in my view) are a good operationalization of empathy.

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**Jennifer Robinson** 24 July 2012 21:52

In Dr. Baron-Cohen's talk he described patients with Autism having low cognitive empathy and high affective empathy. From what I know of autism, there are many different levels or degrees of severity, ranging from a milder form, Asperger, to more severe symptoms in the autism spectrum. Are there any variations in the level of cognitive empathy with patients who have less severe symptoms of autism? And are there any changes in the scores for cognitive empathy over time with patients who receive social skills therapy?

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**Diego Mendoza-Halliday** 27 July 2012 09:20

**CONSCIOUSNESS IS NOT ABOUT SOCIAL BEHAVIOR:** The idea that consciousness evolved to allow organisms to be social is a total simplification. I have a much stronger preference for Damasio's general idea that consciousness confered organisms somehow an advantage in seeking homeostasis overall. In that framework, social behavior is only one of millions of things that organisms need to do to maintain homeostasis.

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**Stevan Harnad** 5 August 2012 19:21

**NOT ABOUT HOMEOSTASIS EITHER**

A million things do to maintain homeostasis -- but no hint of why any of them is felt...
Alfred Mele  Do Conscious Decisions Ever Play a Role in Action Production?

Abstract: I will discuss some alleged evidence (from Libet, for example) that conscious intentions never play a role in producing corresponding actions and some alleged evidence (from studies of implementation intentions) that they sometimes do play this role. I then take up the question whether conscious reasoning ever plays a role in the production of intentions and actions. I set the stage for my discussion by rehearsing a familiar scientific argument for the claim that free will is an illusion.

Comments invited

Posted by Stevan Harnad

25 comments:

Philippe Vincent-Lamarre  7 July 2012 07:31
Consciousness can modulate the intention and modify the outcome of the go signal (muscle burst or not). So maybe it is just a longer chain where there is a “go signal” that might “tell” consciousness to proceed with the action or not.

Alfred Mele  7 July 2012 11:19
I'll be back in my office on Monday. It will be much easier to reply to everyone then. In the meantime, thanks for your comments.

Alfred Mele  9 July 2012 08:53
I'm not sure what you have in mind. Is the go signal you have in mind internally generated, and is it a conscious or unconscious signal?

Frederic Simard  7 July 2012 07:36
The intention is already present before the subject is presented with the go signal. I propose two evidences to support my critizic:
1) During a delayed memory task, (during which a monkey knows he will have to do an action once he gets the go), monkey subject exhibits preparatory activity that shuts down with movement onset.
2) The presence of false start when sprinters wait for the go signal. If intention was born after the go signal, why would they start before the go signal.

My physiological explication is that conscious unplanned arm wrist movements are initiated in the frontal area (cognitive movements) while the signal/go experiment involves the visuomotor loop involving the dorsal stream, parietal areas and motor areas, the later being priony facilitated by frontal areas/attention. (Paul Cisek was referring to this loop)

The adaptive justification for the existence of the two loops is the following, the cognitive loop enables any movements, but is slower, while the dorsal stream (...) loop enables faster movements, but is restricted to simple movement, (direct reach, on obstacle reach).

To illustrate my point, sculpting requires the cognitive loop while harpoon fishing requires the dorsal stream (...)

Alfred Mele  9 July 2012 09:05
You say “the intention is already present before the subject is present with the go signal.” Question: what intention? Here’s one relevant intention: When(ever) I detect the go signal, click the mouse button. Call it intention 1. Here are two theories about what happens. Theory A: Intention 1 and detection of the go signal together generate an intention to click now that in turn generates a clicking action. Theory B: Intention 1 and detection of the goal signal together generate a clicking action without generating an intention to click now. I mentioned these two theories in the Q&A period and said that I know of no evidence that favors one over the other. Are you thinking that you’ve provided evidence in favor of theory B?
Vincent LeBlanc  7 July 2012 07:41
One my ask, using your firecrackers metaphor, why not just having a simpler causal chain? (1) light directly the gunpowder, (2) explosion! The conscious intention (the wick) might be present in some cases, but absent in other ones. In these cases, (1) is necessary AND sufficient to bring about (2). If that is true, it seems strange that in those cases in which an intention becomes conscious (1) is not sufficient anymore. Couldn’t the conscious intention be just an emergent property - not necessary nor sufficient to bring about (2)?

Alfred Mele  9 July 2012 09:13
Yes, a conscious intention to flex now might be neither necessary nor sufficient for flexing. But my point was about a certain line of reasoning. I’m pasting in the quotation from Roediger: “Clearly conscious intention cannot cause an action if a neural event that precedes and correlates with the action comes before conscious intention.” If we apply the same reasoning in the case of the firecracker: we get the following unacceptable result: the burning of a wick cannot cause an explosion because a wick-lighting event that precedes and correlates with the explosion comes before the burning. Both the lighting of the wick and the burning of the wick are causes of the explosion.

Marjorie Morin  7 July 2012 08:38
The comments about “experts” like professional baseball player whose behavior is triggered and done rapidly and it seems without needing any decisions brings the interesting questions of how experience, expertise and intense learning modulates the need for consciousness in our actions. Is it still needed or our behavior has become a kind of reflex?

Marjorie Morin  7 July 2012 08:39
Well of course if we assume it plays a role in our decisions which doesn’t seem that clear for now!

Alfred Mele  9 July 2012 09:19
There a nice passage from William James where he says that consciousness drops out of processes when it’s no longer needed. That’s what’s going on with gear-shifting and the like after you become an expert driver. If things go wrong, consciousness seems to kick in.

Stevan Harnad  8 July 2012 17:12
"Report what to whom? If the data are already in the brain, who else needs to be briefed. It's language that reports to other people, but the problem is explaining why that's felt, rather than just done."

GUILLAUME LOIGNON  8 July 2012 17:15
"Dennett mentions that possibility somewhere: if two modules do not usually communicate, language could "hack" them into doing so."

Alfred Mele  9 July 2012 09:22
Thanks. I don't understand TC's comment, unless TC wasn't at the talk. Anyway, art of the participants’ task in the Libet study is to report to the experimenter where the spot was on the clock when they first became aware of their urge, intention, or whatever.

Stevan Harnad  11 July 2012 15:55
The theory that (language-like), feeling is in order to facilitate or integrate internal information “reported” from here to here inside the brain seems to me to be missing something (essential). Information is data. Data can be transferred between robots or within robots. It is not clear why either the external communication or the internal communication should be felt...

Martha Shiell  8 July 2012 11:09
An audience member asked for clarification on why we can't measure the activity prior to the muscle trigger in the original Livet experiments. I don't know much about EEG, so I don't understand why we couldn't just look for activity prior to the muscle/reported intention that might correlate with forming the intention. Can someone expand?

Alfred Mele  9 July 2012 09:36
In the main Libet study, the muscle burst triggers the computer to make a record of the preceding second or more of brain activity. So Libet does measure activity that happens prior to the muscle burst. Maybe you're thinking about what happens when there is no muscle burst. When the muscle burst is used as the trigger, then in these situations there is no record of brain activity.
Xavier Déry

9 July 2012 06:19

Even if we grant the existence of effective intentions, is this enough to save our folk psychological conception of free will? Even on Mele's interpretation of Libet's findings, actions are INITIATED unconsciously. Mele attempts to save a causal role for conscious intentions but he still acknowledges that they are part of a causal chain that begins unconsciously in what he calls the PPG. I'm not sure this addresses in any serious way concerns over source incompatibilism. And to the extent that ordinary folk are committed to the idea that their conscious selves are the source of their actions (that they consciously initiate their actions) Libet's findings would still be troubling.

That said, I still have a question about Mele's interpretation. Mele attacks Libet's claim that an unconscious decision is already made at the point of the RP. Perhaps the RP is best interpreted as an urge and not a decision. But what about the findings of Haggard and Eimer that appear to show that by the time of the LRP (which still precedes W) a decision of WHICH HAND to use appears to have already been made? If in a free choice paradigm the lateralized readiness potential correlates with the decision of which hand to flex (and not just an urge to flex), why is it not fair to say that an unconscious DECISION has already been made prior to W (even if conscious intentions are part of the causal chain further down the fuse)?

Alfred Mele

9 July 2012 09:56

About the LRP: Why should we think that it's earliest bit is correlated with a proximal intention rather than something that might be among the causes of a proximal intention?

I'm not sure what you mean by my conscious self being the source of my actions. If this requires that my conscious intentions not have any nonconscious events among their causes, then I reject the claim that my conscious self needs to be the source of my actions in order for me to act freely and morally responsibly. (Surely, neural events of which I'm not conscious are among the causes of all of my intentions.) To explain why I'm not a fan of extreme sourcehood as a requirement for free will or moral responsibility, I'd need to explain how I understand free will and moral responsibility. Fortunately, I've done that elsewhere -- for example, in my book "Free Will and Luck".

Gregg Caruso

9 July 2012 14:04

Your latter point is a fair one. I know that you have addressed the issue of sourcehood elsewhere. All I was trying to say is that even if you grant the existence of effective intentions, you cannot dismiss Libet's threat without getting into a larger discussion of what is required for FW and MR (especially as the folk conceive of them). I know that you do that elsewhere but those arguments have to be combined with your defense of effective intentions before free will can be saved.

As for the LRP, it does seem to me that this is more than just an urge. As Haggard describes it, "The LRP has a particular psychological significance in situations where the subject must choose between a left- and a right-handed action: once the LRP has begun, the selection of which action to make must be complete. That is, by LRP onset the intention has progressed from abstract stage ('Do something or other!') to drive a specific movement ('Do precisely this')."

Pier-Éric Chamberland

13 July 2012 09:38

I have interrogations about the implications of the [goal intention vs implementation intentions] or [distal intention vs proximal intention] distinctions (I understand they are analogous) in health behavior change studies.

Ajzen's intention concept was found to be the strongest predictor of a behavior, and was therefore described as a proximal predictor, as opposed to the distal predictors that are attitude, subjective norm and perceived behavior control (note: the distal-proximal distinction here is not analogous to the one found in my 1st sentence).

According to the "intention-behavior gap" currently observed in the litterature (people fail to bring about their intention, and predictive models can only explain up to 50% of the variance of the behavior), Ajzen's intention is a goal intention, a distal one.

We also know that many people do not form implementation intentions (specific plans) despite their "goal" intention to perform the behavior.

What are the implications for the Theory of Planned Behavior? "Goal intentions" are not as strong as we thought?

Above all, what is the link between goal intentions and implementation intentions? Is it as simple as "the strongest the goal intention, the most likely an implementation intention is to be formed"?

What causes the transfer from one to the other? In my opinion, self-determined motivation, self-efficacy and self-regulation are involved in all this, but I don't know which one is the most important.

Dr Mele, I would like to read your impressions on this. Thank you.

Pier-Éric

Alexandre Duval

24 July 2012 11:52

Dr. Mele mentioned at one point that one way of determining the right causal explanation of the Libbet results would be to try to do an experiment where you have the characteristic EEG ramp-up of Libbet experiments but where the subject could choose not to press the button. Something (potentially external) would trigger the EEG ramp-up in a reliable way, but the subject would then have the option not to press the button. But he never mentioned if this or anything like it has been tried. Is there? It seems to me that if suppression is possible it would give strong support to his witch analogy.

Steven Harnad

1 August 2012 18:03

TO DO OR NOT TO DO?

(1) As the clock goes round, every instant that the subject is not deciding to press the button is an instant that he is deciding to "not-press" the button.

(2) But ERPs need an event on which to trigger: What is the event if the subject is not doing anything? What is the premonot potential preparing to "do"?

(3) Of course, the Libet paradigm could be used to test response inhibition instead of response generation. There could be a signal (perhaps a cyclical one), in response to which the subject is asked to press the button, but he is also asked to occasionally, at times of his own free choosing, to inhibit the response, and not-press. The not-press could be timed the same way as the presses (using the average latency of the press after the signal), but what if that likely to show, except much the same picture as for the press?

(4) Libet, in trying to explain away the prima facie implications of his findings for free will, invoked something similar to response inhibition: He said that although our pressing may be unconsciously pre-triggered, we can always consciously override it or veto it, and that might be pre-willed. (That’s rather grasping at straws, complicating the experimental paradigm beyond the reach of interpretability -- and the most likely truth of the matter is that the veto is unconsciously pre-triggered too, just as the pressing is.)
Hakwan Lau: How to study the functions of subjective awareness?

**Hakwan Lau**  How to study the functions of subjective awareness?

**Abstract:** I give some examples of subliminal priming studies suggesting that subjective awareness may not be as functionally powerful as we might think. However these studies as well as most others in the field suffer from a methodological problem: in rendering stimuli unconscious we substantially lower the relevant signal strength, so subliminal priming effects are invariably weak. It is a problem for a whole field to rely on weak effects because null results are hard to interpret and positive results are subject to selection and publication bias. So I propose a new approach to address this problem. The key is to keep signal strength / perceptual sensitivity constant while manipulating subjective awareness, and to see how that affects cognitive functions. This is hard to achieve but I show preliminary data demonstrating how this could be done.

[http://neuro.cjb.net/content/27/21/5805.full](http://neuro.cjb.net/content/27/21/5805.full)  
Empirical support for higher-order theories of conscious awareness
Hakwan Lau and David Rosenthal  
Attention to Intention  
[http://www.fil.ion.ucl.ac.uk/~hclau/Lau_2004_Science.pdf](http://www.fil.ion.ucl.ac.uk/~hclau/Lau_2004_Science.pdf)  
Subliminal stimuli in the near absence of attention influence top-down cognitive control.  
Does response interference depend on the subjective visibility of flanker distractors?  

Comments invited

Posted by Stevan Harnad

11 comments:

- **Martha Shiell**  8 July 2012 10:37  
Lau suggests that if we look hard enough, we will inevitably find that any cognitive function can occur unconsciously. Just because we have not yet found one that is exclusive conscious does not mean that we never will.

- **Pauline Claude**  17 July 2012 06:06  
I'll tend to have the same reasoning as Hakwan Lau, mainly that any cognitive ability might be possible without consciousness. However, although removing consciousness for a single given cognitive ability at a time might be possible without necessarily lose the ability's efficiency, what about removing consciousness in all the cognitive abilities at the same time? I would highly doubt about the efficiency of such an individual to maintain his/her survival and allow his/her reproduction. What I mean is that if we have some evidence such as blindsight that consciousness is not necessarily needed for an object detection that is usually done by conscious visual stimuli, we cannot infer that consciousness is absolutely not necessary for species like ours who evolved with consciousness. To my knowledge, there's no example of an individual who is able to behave with a complete loss of consciousness. Actually, such individuals are simply in a comatose or a vegetable state. So yes, some cognitive abilities can occur without consciousness, but we have to keep thinking in terms of an individual as belonging to a specific species. If a human cannot behave without consciousness, therefore, consciousness is needed for a human's life and therefore, consciousness is at some point necessary for life. That's why I think using the robot argument to discredit the real utility (or adaptive function).

Also, I think that there might have a cognitive function that is exclusively conscious and that might be the one that shut everything down when an individual fall in a comatose state...

- **Nico Sheppard-Jones**  31 July 2012 17:45  
Very elegant designs, and I am curious to see findings from his TMS study. What I really appreciated about Lau's talk - within the broader context of the Summer Institute - was that he defined his working definition of consciousness (more or less "subjective awareness of relevant perceptual info"). If we were, instead, to take Pr. Harnad's consciousness = feeling definition, then the notion that a "cognitive function that occurs unconsciously" would not make any sense (apart maybe from some cognitive functioning that occurs during sleep). His definition of the term spared me some confusion!

- **Stevan Harnad**  5 August 2012 10:59  
**SPRING CLEANING**  
"Subjective awareness of relevant perceptual stimuli"?  
Why the "subjective"? Is there any other kind of awareness?  
And why the "relevant"? Awareness of irrelevant stimuli is not consciousness?
And what's "perceptual"? If a feeling of anxiety or doubt perceptual? Or just a feeling?

And why a "stimulus"? If you hallucinate, so it feels like you're hearing a sound, but there's no acoustic stimulus, is that not consciousness?

What does that leave us: "subjective" is gone, "relevant" is gone, "perceptual" is gone, "stimuli" is gone.

That leaves "awareness of feeling something"

But can you feel something without being aware?

And can you be aware without feeling something?

Welcome back to weasel-word-free feeling...

Nico Sheppard-Jones 8 August 2012 20:45
I agree with your view Prof. Hamad, but Dr. Lau put forth a definition, which I think is commendable - even if, ironically, it makes portions of his talk more amenable to consciousness-critique.

Hakwan Lau 12 July 2012 20:32
Hi Martha,
Yeah that's basically what I think. But perhaps my point is more that we will find "empirical evidence that apparently support" subliminal priming of almost any function. Whether these effects are real, I don't really know. It's hard to distinguish small effects some null effects some times....
H

Jules Pelletier 16 July 2012 16:11
But although subliminal priming is in theory possible for any cognitive function, does it necessarily entail that conscious cognitive functions are superfluous? I believe work in that perspective would also lead to subliminal priming's limits. In that sense, it would concour to the very important problem of defining consciousness' boundaries.
Keep it up, Hakwan!

Martha Shiell 17 July 2012 07:34
Thanks for the reply Hakwan :)

Alexandre Duval 19 July 2012 08:41
I wonder whether the first experiment discussed by Dr. Lau -- the one involving subliminal priming with diamonds and squares in a cognitive control task -- shows without doubt that cognitive control can occur unconsciously. Here is an alternative interpretation: the subliminal priming only prepares certain areas of the brain for one the two tasks (semantic or phonological), but it doesn't actually start the whole process of answering the relevant question ('Is it concrete?' in the semantic case 'Is it monosyllabic?' in the phonological case). The relevant area (be it the semantic module or the phonological module) then waits for the allocation of mental resources like working memory in order to operate fully. And this allocation only occur as the result of a conscious decision. Of course, this interpretation could only be plausible insofar as we can make sense of the notion of 'preparing' a module. Is this in any way plausible considering what we know in neuroscience?

Xavier Déry 31 July 2012 11:56
Lau believes that if you wait long enough, all cognitive tasks will be proven to be unconsciously done... Still no function then!

Luiz Pessoa : Cognitive-Emotional Interactions

Luiz Pessoa Cognitive-Emotional Interactions video

Abstract: The current view of brain organization supports the notion that there is a considerable degree of functional specialization and that many regions can be conceptualized as either 'affective' or 'cognitive'. Popular examples are the amygdala in the domain of emotion and the lateral prefrontal cortex in cognition. This prevalent view is problematic for a number of reasons. It will be argued that complex cognitive-emotional behaviors have their basis in networks of brain areas, none of which should be conceptualized as specifically affective or cognitive. Central to cognitive-emotional interactions are brain areas with a high degree of connectivity called hubs, which are critical for regulating the flow and integration of information between regions. To illustrate cognitive-emotional processing, I will discuss a series of studies that have investigated interactions between emotion and perception, and emotion and executive function. In the final part of my talk, I will address the following question: What is the relationship between emotion and consciousness? I will discuss how large-scale interactions are critical for both emotion-cognition and consciousness, suggesting that the study of these interactions is needed for advancing our understanding of their relationship.


Comments invited
Shady Rahayel  7 July 2012 09:28
Wow! Thank you L. Pessoa for having exposed a new way to think about the brain. Let’s forget about that tendency that we humans have to categorize things so easily; we should no longer behave on the basis of brain regions or neural networks. Neural networks as being part of bigger networks that create computational maps representing behaviours in the end is really something I’d like to see more often. We shouldn’t be expecting from the localization approach to inform us about structured behaviours (and especially not consciousness).

Since the very first beginning of this summer school, I’m aware of how much importance is given to interneuronal relationships (in visual perception overall), but these are still not convincing enough in light of the complexity of the subject matter we’re investigating all. We need to think absolutely in terms of functional connectivity and to use engineering, computation, mathematics, to integrate all of this.

Luiz Pessoa  7 July 2012 11:49
Shady, thanks for your compliments!
I agree with you in all respects, but I’m in the minority in “cognitive/affective neuroscience”. Most researchers are very structure-centric.
My own background is math, computer science, and computational neuroscience. So I definitely encourage you to pursue these areas. I think they are absolutely critical to successfully studying the mind/brain.
Let me know if you want to discuss any of these issues further!

Shady Rahayel  7 July 2012 12:21
Thank you for your response!
The vast majority of the presentations that were part of the summer school had a localization approach (i.e., brain regions and loops, because I tend to consider loops as being investigated on a localization approach too). Although they all present very important findings and are necessary, I know that we’ll never find any answers in continuing only in this direction.
I don’t possess any background in math, computer science, and computational neuroscience. I have a neuropsychological background, which is interesting when understanding things on a more holistic level; however, when it comes to research, I think that it’ll get always more complicated for us neuropsychologists, physicians, philosophers, to get involved in research. Research appears always more and more open to people like you, who possess the adequate knowledges to pursue such fundamental studies and who can have a very much integrated understanding of where we are, what has to be done, and if it can be done. This “novel” approach of understanding the brain is particularly important in a clinical setting because without changing the big lines that we have of the roles of brain regions, it still has a lot of relevance to better characterize people’s injuries if we can have an integrated idea of how everything communicates.
I am fascinated by this approach and surely will read more of your publications.

Luiz Pessoa  7 July 2012 12:30
But remember that one can, at any point in our lives, try to learn new techniques or areas. It’s not easy, but worth learning some of the basic vocabulary of fields that are new to us.

Good luck!

Ana Pesquita  8 July 2012 07:48
Thanks! It is really great to read this encouraging comments on learning new skills at any point of live!

Roberto Gulli  7 July 2012 09:39
Dr. Pessoa presented a wealth of fMRI data suggesting that presentation of emotionally relevant stimuli increases performance on tasks related to perception. He used this data to conclude that emotion and perception/cognition are inextricably linked together.
As far as I was able to gather, all of these studies used aversive stimuli (electrical shock, fearful faces) to evoke an emotional response. How does one dissociate the confound that all of these stimuli will modulate attention and/or arousal, independent of their emotional significance?

Luiz Pessoa  7 July 2012 11:58
Roberto,
you bring up an important point, one that is at times brought up by my colleagues too.
I did not talk about a second, parallel, line of research that I develop on perception/cognition and motivation (= reward). In that area, your question is even more brought up.
While I think this issue needs to be considered to some extent, I know believe that it is probably misleading to try to separate these issues as atomic processes. More discussion on this will be available in a book I’m finishing up. One place to take a look is this paper of mine: http://lce.umd.edu/publications_files/Pessoa_FrontNeurosci_2010.pdf especially Figures 3C and 3D.
Let me know if you have other questions.
Audrey Doualot  7 July 2012 14:38
Dr Pessoa,

Could you specify the notable differences that you might have noticed in the connectivity characteristics as regard negative and positive emotions, in the way the information is processed?

The field of research on positive emotions seems to be relatively recent compared to negative emotions. Both kinds of emotions involve different cognitive consequences. For instance, according to broaden-and-build theory of Barbara Fredrickson: negative emotions narrow the spectrum of thought actions whereas positive emotions broaden the repertoire of thought actions. How does the neural connectivity level inform us?

Thanks,

Audrey Doualot

Luiz Pessoa  7 July 2012 19:09
Hi Audrey,

I'm not aware of anything that looks into that the way you ask. People (and my lab) have looked at connectivity with reward, but that's a little bit different and not what you are thinking about, right?

In any case, check this paper if you are interested:

Audrey Doualot  8 July 2012 19:41
Indeed my question was not focused on reward. However, thank you for the reference. This is very interesting.

Audrey Doualot

Marjorie Morin  7 July 2012 16:21
I'm a bit confuse about what Dr. Pessoa said: "attention is required for the expression of valence". I'm not sure what he means by that. When perceiving an aversive stimulus our body is already preparing to react even without being truly conscious of what we are dealing with so the valence is present. Maybe I misunderstood something? (sorry I had published this comment on Dr. Lau's abstract page by mistake)

Luiz Pessoa  7 July 2012 19:12
Hi Marjorie,

you say: "When perceiving an aversive stimulus our body is already preparing to react even without being truly conscious of what we are dealing with so the valence is present."

That's exactly what my research is challenging. I don't see that in my experiments. When I say that attention is required for the expression I mean that attention is required for the valence effect (fearful > neutral) to be observed. Otherwise, there was "no" difference between the conditions. This is what my research and many other follow up studies show.

Marjorie Morin  7 July 2012 19:33
Thank you! I clearly had misunderstood! I will make further reading on this subject, it is very interesting since for now I had learn that we had a "reflex-style" reaction to an aversive stimulus and then modulate our reaction with the context (like "oh my a snake! Oh it's in a cage"). Thank you again for your answer!

Luiz Pessoa  8 July 2012 05:53
You can find my papers at emotioncognition.org. Several are conceptual papers that summarize many of the issues. One possible entry point is the one with Ralph Adolphs in Nat Rev Neurosci. You can just skip or skim the more anatomical parts, but the argument is made there in a pretty complete fashion.

I had a blog that I need to start updating again that makes the points in summarized fashion:
http://cognitionemotion.wordpress.com/

Another paper is on the amygdala itself, which does a lot more than just "fear":
http://lce.umd.edu/publications_files/Pessoa_Neuropsychologia_2010.pdf

Pauline Claude  7 July 2012 18:34
Emotions have been quite neglected so far in the different talks. However, as Luiz Pessoa showed, it seems to be quite central with the notion of feelings and consciousness. What is it to feel if not telling us that something "feels" good and has to be done again or that something "feels" bad and don't have to be done again. And what about memory? also neglected so far. If no record of the feeling of the outcome is done, how consciousness can even exist?

Luiz Pessoa  7 July 2012 19:13
I agree that emotion is quite central to consciousness and that it is relatively neglected!

Pauline Claude  7 July 2012 20:08
Luiz, what do you think of Damasio's integration of emotions in his last book "Self comes to Mind"?
I haven't read it yet, but should do that soon!

Dr. Pessoa, do you have any plans to do MEG or EEG concurrently with your fMRI studies? It will be interesting to know how functional connectivity measured using these methods with greater temporal resolutions match up with your results from fMRI? (I know your fMRI analysis is already a lot and quite informative but just curious what is in the works for your lab!)

yes, we will be starting that soon. I have a couple of EEG/MEG studies but they don't address the integration part which is something that I want to focus on.

Here are the links:
This one is not online for some reason (I can send you if you'd like):

Pessoa proposes that emotion and perception are highly-integrated and non-dissociable. I'm interested to see how this perspective translates into other cognitive functions are are difficult to separate from consciousness, like language or decision-making.

sorry, I have no idea about this one!

Great talk, and your ideas on global consciousness networks were, I think, some of the most compelling we've heard at the conference so far!
There was some discussion on the relevance of the more primitive retina→superior colliculus→amygdala path - Maybe I missed this point, if it was addressed, but is it possible for blind patients to undergo unconscious visual fear conditioning via blindsight mechanisms? If so, Dr. Pessoa and Dr. Lau could come up with some excellent collaborative work

I have problems that residual vision goes via the pathway that you are indicating; see a summary in a blog that I have not updated much lately: http://cognitionemotion.wordpress.com/
But there are lots of other pathways that could support those abilities.

At the end of his talk, Dr. Pessoa claims that it is not possible to identify certain areas of the brain as pertaining to solely to emotions or as pertaining solely to perception/cognition. The empirical evidence he gives for this view is very persuasive, but he sometimes seem to defend a stronger view, namely that there are no psychological mechanisms that are purely emotional or purely cognitive. (That is how I interpret his claim that emotions and perception/cognition are highly integrated and not decomposable.) On the stronger view, logical reasoning, for instance, would have both an emotional and a cognitive component and it would be impossible even in principle to take these two components apart. I wonder if this is plausible. Is there any empirical evidence supporting the stronger view? Or I have misunderstood Pessoa?

Logically inferring from P→Q and P that Q is doing (computation); but understanding that it is true is feeling -- just as Searle's understanding of English and non-understanding of Chinese are both feeling, not just doing (saying).

Pessoa found that monitoring paired brain structures helps to predict behavior more accurately than checking single regions. Nice!

I really enjoyed Dr. Pessoa's view of the way we should understand the brain. During my undergrad degree in psychology, I always have been skeptical towards neuroscience, since I always found it to be a new version of phrenology. Yet, I find myself in this field because of researchers like him, who encourage us to think outside the box and to challenge the generally accepted visions.

Through the conference I've been wondering if our trouble with researching consciousness isn't something basic to the way we study things: we analyze, separate, distinguish, analyze. If consciousness is supposed to be an integrative process, we may run into trouble simply by the way we study things.
Pessoa's perspective in seeing emotion and cognition as inseparable, takes a step towards this integrative perspective that may help us elucidate the processes of consciousness. Perhaps other processes are interlinked similarly and using this approach will allow us to make several steps further in our understanding of the brain.

Frédéric Banville  4 August 2012 16:17
Of course, the process by which we get to such an integrated perspective is by positing functional specializations that turn out to be false. Localization (and decomposition) as a standalone explanatory strategy can obviously be tremendously naive. But, if we regard it as a research heuristic, then its value becomes quite clear. Localization and decomposition often yield overly simplistic views of how a given system works, but even those failed hypotheses are informative.

Frédéric Banville  4 August 2012 18:36
I forgot to mention something:

My point is that decomposition and localization are (at least according to Bechtel and Richardson 2010) basic and extremely useful research heuristics. Even if we decompose the brain in a set of interconnected networks of areas, we're still decomposing a system. The difference is that this particular decomposition strategy might be more fruitful than previous ones because it rests on a more accurate view of the brain.

Of course, calling attention to a faulty decomposition hypothesis is an important step in brain research!

Nico Shepard-Jones  31 July 2012 23:53
I came across an interesting article that explores the link between abnormally high emotional load (nightmares) and cognitive performance (as assessed though neuropsychological tasks). In support of Dr. Pessoa's theories, those with nightmares performed more poorly on cognitive tests. The findings could not entirely be explained through concomitant sleep deprivation or waking anxiety. Moreover, nightmares were associated with abnormal prefrontal and fronto-limbic activity during REM sleep.


I thought Dr. Pessoa might be interested since this slightly different approach to similar questions yielded corroborating evidence!

Marthe Kiley-Worthington: Comparing Elephant and Equine Mental Traits, Subjectivity and Consciousness

Marthe Kiley-Worthington  Comparing Elephant and Equine Mental Traits, Subjectivity and Consciousness

Abstract: A combination of both reviewed scientific knowledge and knowledge gathered from philosophy of mind, critically assessed anecdotes & centuries of folk knowledge concerning the cognition of other mammals (Conditional Anthropomorphism) is proposed as a rational method to begin to outline these species subjectivity & consciousness. This paper briefly examines mammalian similarities and species differences in bodies & behaviour ( sensations, feelings, emotions learning, ecological and social knowledge, rationality, dreaming & imagination, awareness of self, theory of mind & comprehension of human language), their probable resulting mental attitudes, subjectivity and type of consciousness. Such an approach allows a greater understanding of another species consciousness, and can, perhaps, enrich our own.


Animals in circuses and zoos: Chiron's world http://www.cabdirect.org/abstracts/19912259033.html

Comments invited

Posted by Stevan Harnad

25 comments:

Shady Rahayel  7 July 2012 11:33
Yours truly, I don't understand the relevance of these presentation.

Olivier Veillette  7 July 2012 11:44
Keep an open mind Shady!

Stevan Harnad  7 July 2012 11:44
The relevance of what to what?
I don’t understand. What is the point of this presentation in elephants’ consciousness if nothing has been defined? I’m thinking about that histogram on personality.

I think the speaker said she did not have time to discuss the slide on personality differences other than to name them, but they are further discussed in the paper. (Be careful not to be too scientistic... That was what the speaker was calling into question, if one really wants to know whether and what animals feel.)

If one really wants to know whether or not an animal feels, I don’t think it should be determined from an outsider’s perspective. It would be as biased as attributing to a teddy bear feelings and emotions: we would be “projecting” (I don’t like the word) our very own states of mind into it. I do not have a particular approach to solve the hard problem, apart from the fact that I still have, in light of all the conferences watched so far, “hope” that one day could emerge from the “doing” a better understanding of the “feeling”. I know your opinion, but I’m not here talking about the basic mechanisms but of a more nuanced idea of what feeling is (still not its mechanisms, but a real questioning of the notion of feeling).

Maybe also that the “hard dilemma” is an irresolvable question. What I think is that we should not be trying to explain the feelings of any dog, or elephant, from an external perspective only as in this conference: it is a preferential track to be biased and anthropomorphically driven by our human biases. The same goes for our interpretation of other human beings’ needs: our intentions might be wrong, good, spot on, out of the blue, etc.

As I understood her talk, Kiley-Worthington didn’t pretend that her arguments concerning horse and elephant consciousness were absolutely indubitable. As she said herself, she was only trying to shift the burden of proof in debates concerning animal consciousness. This is why the kind of arguments about behavior she adduced were useful.... I am not sure how we could try to explain the feelings of dogs or elephants other than from an external perspective.

I think that that kind of observations, even if they have no “real scientific bases” are really important. Don’t we do systematic observations in behavioral therapy? Isn’t it how Darwin found his evolution theory? The observations that Dr. Kiley-Worthington shows of courses doesn’t mean that animals have a consciousness but makes us feel like they do. This is just accumulation of evidence that points to consciousness. We could be wrong, but as Dr. Harnad said, we could be wrong about other humans too.

Of course, our operational definitions of animal consciousness will be inherently faulty, as we will never know what it is like to be a horse, or to be an elephant. This absolutely does not dispel the need for observation based studies of the behaviour of sentient beings.

One possible ‘real scientific’ use for this is in the creation of behavioural phylogenies amongst all vertebrates - we all too often assume our human ‘doings’ are exceptional.

"Even though no anthropomorphism proponent would propose to apply such language uncritically, even the staunchest opponents of anthropomorphism do not deny its value as a heuristic tool." Primates and philosophers, 2009, p.63

We can use anthropomorphism to elaborate hypothesis and to qualify observations because we are part of the scientific process. Like Prof. Harnad pointed out: it is better to overrate than underestimate when we are talking about animals.

I was wondering if you thought that animals had something like Axel Cleermans "Consciousness is the brain’s unconscious theory about itself." Do you think that animals know that they are different from each other in the fraternity and act accordingly, have something that relates to a "theory of the self"?

I think the same thing as Thierry about animals in ‘hierarchical’ social structures and what it would mean when they act accordingly to their ‘status’ about their recognition of others in their species and their own role in the ‘society’. If they had ‘theory of the self’, what would that entail? Also, what would it mean if animals were/are able to distinguish themselves as different from other species? To me these would re-enforce a social structure in animals; however, does this strengthen our attribution of consciousness to animals? (considering a social structure does not seem necessary for consciousness)
exactly this approach involves? We need to accurately define it if we are going to use it. Perhaps the "conditional anthrophomorphic approach" will allow us to justify the use of anthropomorphic intuitions without falling into a trap. Can someone expand on what different situations. He may be hungry, lonely, welcoming, frightened. What he is communicating can only be assessed from looking at the context. (Kiley 1974 paper).

An example of 'context independent' communication is a neigh of a horse. He will neigh, and the same neigh (we have measured 10 parameters of several 100 calls) in all of these and others that were not. Thus there were individuals one could say were 'socially involved' and some who were not, like in humans.

This was an effort to look more closely at social organisation and the similarities or differences to human language. The most important results were:-

1) The idea of a dominance hierarchy (which like consciousness is rarely defined and has become a metaphysical belief in ethology) did not fit well in these free ranging animals. There was no inverse correlation with aggression & withdrawal as there should have been.

2) There were individuals who had different roles: some performers some receivers, some 'extrovert' some 'introvert', some aggressive, some affiliative, some just 'uncertain' etc.

3) We then looked at the number of times a behaviour was performed and the same behaviour was performed as a recipient response, 'do as you have been done by'. There were 11 of the 85 behaviours in elephants (and more or less the same % in rhinos and horses) which were very significantly (P.0.001) more likely to be done back. Does this mean anything about imitation or mirror neurons? I don't know but just a thought and something we are continuing to work on.

4) because the dogmatic belief in the organisation of hierarchies in terms of competition did not fit here, perhaps it is not relevant here. These large herbivores do not have to compete for patch food distribution, or anything else in their day to day lives particularly, it is either available to all or to none, eg grass, leaves, shade, shelter, water etc... so why do we have to think about their organisation in terms of competition? There is no need for this, but if sharing of information about the environment (by social learning for example) is one of the main reasons for living in a group then each individual needs to make sure he is accepted and can stay in the group. To this end we looked at 'sticking behaviour' (being nice to each other showing interest etc) and 'splitting behaviour' (being nasty, or avoiding others). Over 70% of the behaviours in each species showed 'sticking' and interestingly we also measured 'ignore': do nothing when someone does something to you, and that was very common... perhaps a sort of deflationary strategy. All of which makes one wonder if we should not look more closely at the organisation of mammalian societies and perhaps evolutionary dogmas?

An example of 'context independent' communication is a neigh of a horse. He will neigh, and the same neigh (we have measured 10 parameters of several 100 calls) in different situations. He may be hungry, lonely, welcoming, frightened. What he is communicating can only be assessed from looking at the context. (Kiley 1974 paper).

There are some behaviours that are situations specific (eg tussking another if an elephant, = aggressive imitation) but most of the vocal and visual behaviours we measured (we measured the responses to try and assess the meaning) were context independent (tail wagging, head shaking, flap ears, swing trunk etc).

Hope this helps, let me know if further points.

Peter Fugger 7 July 2012 21:59
It was quite interesting to hear that the meanings of messages given to equines are context dependent. Can you please give some examples? If I got it right this should be some kind of evidence that equines have consciousness as usually consciousness is supposed to be involved with such higher cognitive functions.
I did say all this in the talk by the way, sorry it was not clear?

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**Marthe Kiley-Worthington** 9 July 2012 03:50

But bees are not mammals are they? Insectsbrates may have TOM and other things of that nature but will be doing it very differently. Do you really think that a wasp and a bee have a similar consciousness/feelings, and that this is quite different from yours? We know something about wasps, let us start there.

Bees read particular ritualized messages from others, but I am not convinced they know that the other is a mind and has feelings and desires. I just think we need to start somewhere rather than switching off from others. It may be that the world has a collective consciousness who knows... we cant rule that out.

Equines/elephants/weasels social life is very complex and in many ways similar to ours, not like a bees, and it is very difficult to work out a system how this would work if they were not conscious in the sense of having some idea of another feelings.. they also make mistakes do bees?

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**Xavier Déry** 31 July 2012 11:57

I like the distinction M. K-W makes between folk belief and folk knowledge, the latter lengthy confirmed and in line with evolution

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**Laurence Dumont** 31 July 2012 16:55

Looking at her paper, I really liked Dr Kiley Worthington's approach to animal personalities. This is the start of a really interesting field and opens the possibility to draw parallels between species. I might be afraid it is impossible to get out of our human perspective while exploring other animal's subjectivity though.

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**Axel Cleeremans** : Consciousness and Learning

**Axel Cleeremans**  : Consciousness and Learning

**video**

Abstract: Here, starting from the fact that neural activity is intrinsically unconscious, I suggest that consciousness arises as a result of the brain's continuous attempts at predicting not only the consequences of action on the world and on other agents, but also the consequences of activity in one cerebral region on activity in other regions. By this account, the brain continuously and unconsciously learns to redescribe its own activity to itself, so developing systems of metarepresentations that characterize and qualify their target representations. Such re-representations form the basis of conscious experience, and also sublend successful control of action. In a sense thus, this is the enactive perspective, but turned both inwards and further outwards. Consciousness amounts to 'signal detection on the mind': it is the brain's (non-conceptual, embodied, implicit) theory about itself. By this hypothesis, which I call the "radical plasticity thesis", consciousness critically depends on a cognitive system's ability to learn about (1) the effects of its actions on the environment, (2) the effects of its actions on other agents, and on (3) the effects of activity in one cerebral region on other cerebral regions.


Comments invited
What and how strongly you feel is a matter of degree. But whether you feel (anything at all) is not: It is all-or-none.

Just to make your point clear: Do you think "feeling" is an operative concept?

So can we say that the blind-sight subject we saw in the video avoiding obstacles is experiencing an unfelt seeing process. In other terms he avoiding the objects in the same way a robot would do it, it's an unfelt doing. That's why he claim he can't see anything, because the feeling process is unreached for the perceptual modality.

The blind-sight patient, unlike a robot, feels *something* while he is walking, he just does not see anything. But since he does not bump into anything, his brain must be detecting optical input, and transmitting it to the locomotor system. (The patient may nevertheless feel a motor urge or inclination to move right instead of left...)

I was sort of unconvinced by Cleeremans' argument that we sometimes have graded conscious states. He used two types of data to infer his conclusion: (1) The subjects' self-report about how it felt to perform some task; (2) The subjects' performance on that task. But this does really entail the existence of graded conscious states. Regarding (1): there are many cases where we are fooled by our intuitions about our own mental states (the work of Haggard comes to mind here, where he argued that sometimes we feel most in control of our actions when we are less in control). Moreover, it might be the case that subjects confuse the fact that some of their fully conscious states are very quickly forgotten with their being only partially conscious. Regarding (2): The linear change in performance might be explained without positing graded conscious states. It might be the case, for instance, that conscious performance and unconscious performance use more or less the same mechanism and that this mechanism is simply better when we exposed to the image for a longer time.

All good points, the question of whether consciousness involves a sharp, dichotomous crossing of a threshold vs. more linear, gradual changes as a function of stimulus quality is a challenging question, but one that I see as having fundamental implications for our understanding of the mechanisms of consciousness (and which certainly distinguishes between two current theories -- Dehaene's NWT and Lamme's Recurrent processing hypothesis).

I am struck, essentially, by the fact that conscious experience has a consistently graded character for me. At any moment, I am aware of many different things and in many different degrees -- from vague far-away street noises to the visual impression of looking at my computer screen to a vague pain in one of my feet; it all forms a unified, richly structured and graded phenomenal field. Contrast this with the rather all-or-none experience of detecting a single stimulus on a computer screen in a darkened room. These are completely different experiences.

The trouble with gradedness is that you can get gradedness out of the combination of graded stuff or out the combination of binary elements (e.g., vinyl vs. CDs). Kouider explicitly developed the latter position with the notion of partial (vs. graded) awareness.

Perhpas Dr. Cleeremans choose to check the twitter feed in the middle of discussion to illustrate that descent into a different grade of consciousness is possible.

What is truly missing from contemporary and (as far as we can tell) forthcoming robots is a sense of life and death on the one hand, and individuality on the other. Any living organism is endowed with drives to reproduce and to survive; there is nothing "felt" that is comparable in robots. The further difference is that each
individual organism is unique and simply cannot be cloned in terms of reproducing that organism's particular trajectory through existence. Not so for robots.

I am not sure we want learning robots that fear death and want to reproduce, though.

Andreas Kalckert 8 July 2012 07:21
Something they miss too is from my point of view a sense of their own physical existence. Most robots we saw have some sort of actuator and a camera to perceive something from the outside world. However, Reklitis mentioned there are some sort of proprioceptive sensors available, but so far I have seen no attempt in the field of robotics to investigate how the perception of the own body could be achieved by a robot. And even if they have multiple sensors, I am still wondering how much they are processed in a multisensory way. I would be curious to see a robot which has proprioception, somatosensation, vision, and then goes to explore the world and has to realize at some point that his body and the world is something different. It is a bit far fetched now, but I think this experience would also lead to an experience with certain aspects you mentioned now, Axel. So, we would need a robot with a Camus-like experience... ;)

Martha Shiel 11 July 2012 07:49
Dr. Cleeremans is correct in his description of what is missing in robotics, but I don’t see how these features are necessary for consciousness, or how they fit into the radical plasticity thesis.

Stevan Harnad 11 July 2012 15:44
What robots lack is that they do not feel, they just do.

Axel Cleeremans 11 July 2012 17:12
Dr. Cleeremans is correct in his description of what is missing in robotics, but I don’t see how these features are necessary for consciousness, or how they fit into the radical plasticity thesis.

The idea is that to feel as we do, robots would need to assign value to things, and the only manner in which this can be achieved is through experience learning about different things so that you can prefer some over others. That makes you seek those things, avoid others, and so on. No robot today does that, for nothing ever means or does anything to them. Minimally, this would require (1) some basic drives, (2) ability to learn. That’s where it fits with the RPT.

Stevan Harnad 11 July 2012 18:09
But today’s robots "can" learn and they “do” have “drivers” (as any servo mechanism does). I am not sure what "assigning value" means, unless you mean feeling: I seek sugar because it tastes good: that has "value" for me.

Axel Cleeremans 12 July 2012 08:37
That’s exactly what I mean!

Inge Broer 31 July 2012 18:04
So if a robot knows it’s running out of battery and knows it needs to get to a power supply... does it "feel" something we might call "tired"? And is it conscious of its state? Would that be enough to ascribe feeling to it?

Stevan Harnad 4 August 2012 15:08
KNOWING KOANS @ Inge Broer
"Knows" is alas yet another weasel word.

A robot, like a thermostat, can detect when its power is running low, and it can act on it (re-charge), but if it doesn’t feel it, then it doesn’t know it.

Actually, even if it feels its power is low, it only believes it, it doesn’t know it. Maybe its power is not really low; it just feels like it.

The only two kinds of things we can know for sure (rather than just believe with high probability) are necessary truths like (1) 2 + 2 = 4 or not(P & not-P) and (2) that we are feeling whatever it feels like we are feeling while we are feeling it (Descartes’ Cogito, on certainty).

If you want to know why and how believing something that is in fact true, and even believing it for the right reasons is still not the same as "knowing" it, see some of the Gettier koans about knowing.

And if you’re really desperately interested in knowing more about knowing, see:


Frédéric Banville 4 August 2012 16:05
To expand on Prof Harnad’s point about "knowing":

If one takes "knowing" as implying certainty, then most organisms that we construe as able to know things don’t actually know anything. For instance, most mammalian species have to navigate complex environments. To do so requires processing information about that environment. A rabbit needing to avoid predators needs not determine that path A is certain to be free of predators, only that path A has the lowest probability of causing a run-in with a predator. Numerous organisms make those kinds of decisions very often, and that type of process need not involve "feeling" in any sense (although emotional reactions might offer a reliable heuristic for making those decisions, but that’s only relevant if we equate emotion with "feeling").

I assume a similar story could be told about the rabbit (or robot) "knowing" that it is tired.

So a robot does not need to "know" that it is running low on power (even if it could).

Stevan Harnad 4 August 2012 18:18
THE NEED TO KNOW @Frédéric Banville
But even to believe it is running low on power, the robot needs to feel. Otherwise it is simply a servo that can detect (and correct) when it is running low on power.

**Frédéric Banville** 4 August 2012 18:44
@Stevan Harnad

Of course, but I don’t see how the rabbit in my example has to believe anything. The robot, likewise, doesn’t need to believe that it is running low on power...?

**Stevan Harnad** 5 August 2012 09:10
KNOW-HOW: UNFELT & FELT
@Frédéric Banville

All the robot or the rabbit "needs" is doing, and that’s the problem.

Neither believing (nor, a fortiori, knowing) are needed for doing. And that, once again, is the problem.

My point was that "knowing" (and believing) area weasel-words, insofar as consciousness (feeling) is concerned: Unconscious know-how is not knowing, it's just know-how, as in "a vacuum cleaner knows how to suck up dust.

The difference between the rabbit (and today's sub-Turing) robots is that the rabbit has know-how and also feels. The robot (and the teapot, and the vacuum-cleaner) only have know-how (doing).

**Pauline Claude** 7 July 2012 19:20

Two fundamental things to understand mechanisms underling it that Axel Cleermans mentioned when he presented the misconceptions of consciousness: consciousness is not a single thing, and consciousness is not all-or-none!

**Stevan Harnad** 7 July 2012 22:17
Both these things might warrant a little more reflection, starting with replacing the vague weasel-word "consciousness" with "feeling": There are many different feelings, qualitatively and quantitatively (and temporally), but whether an entity feels anything at all (or feels anything at all now) is an all-or-none matter, and feeling is feeling, not something else. It is the difference between organisms like us and teapots. Axel Cleermans' findings have no bearing whatsoever on that; they are merely about detection thresholds.

**Pauline Claude** 8 July 2012 17:26
COMMENTS COPIED AND PASTED FROM THE CORRESPONDING POST ON FACEBOOK:

Stevan Harnad ::
"Both these things might warrant a little more reflection, starting with replacing the vague weasel-word "consciousness" with "feeling": There are many different feelings, qualitatively and quantitatively (and temporally), but whether an entity feels anything at all (or feels anything at all now) is an all-or-none matter, and feeling is feeling, not something else. It is the difference between organisms like us and teapots. Cleermans' findings have no bearing whatsoever on that; they are merely about detection thresholds."

Frederic Simard :
"Double like for "consciousness is NOT all-or-none", working with monkey definitely lead me to think they are conscious, to a lesser extent than human, but still conscious... And I'm ready to extent it to dogs/cats and so on..."

Stevan Harnad ::
"Being a little bit conscious is like being a little bit pregnant..."

Frederic Simard :
"And just like there are several stages in consciousness, there are several stages of pregnancy which manifest differently in the behavior and anatomy of the pregnant women."

Stevan Harnad :
"Distinguish the question of (1) "what" and "how much" you feel from the question of (2) "whether" you feel (anything at all). The former is a matter of quality and quantity, but the latter is all-or-none. The "hard problem" is about the latter (2), not the former (1)."

SHADY RA :
"Let's say that other beings (such as dogs and monkeys) feel. We accept it and we take it as granted, or we rely on subjective studies of elephants behave, etc. They feel, just as once one woman is pregnant, she just cannot be semi-pregnant: an all-or-none condition. We take it as granted.

From that point on, how come it seems so irreconcilable to accept that consciousness exists, that it emerged at some point, but not necessarily yield the same characteristics as in human beings.

I mean that flies perceive a different array of wavelengths, which might yield a different consciousness of the world that surrounds us. Every time I open up the faucet in my kitchen, the water flowing down will have a different stream in absolute. It might be the same for consciousness: it emerges and once emerged, it might follow a different way of "expressing" itself, with several characteristics coming from our biological existence, our brain capacity, etc."

Frederic Simard :
"You are right, but I guess (and I'm sure this is what motivates Dr. Kiley-Worthington) studying the various level of consciousness can lead us to understand the causation of it. Just like pregnancy, at first a baby comes out, rolling back the mother became bigger and bigger over time and rolling back again a man did something funny to her ;), but I'm not adding anything to the discussion..."

**Nico Sheppard-Jones** 24 July 2012 14:04

(In response to the Steven Harnad: FB comment pasted above)

I have difficulty, in the context of this summer institute, ascribing a 'weasel-word label' to "consciousness". Certainly, one of the aims of this institute should be to better define the term "consciousness", not to do away with it. Evidently, not everyone agrees that there is a one-to-one correspondence between feeling and consciousness.

That is not to say that I do not think we should investigate the merits of the association. As a heuristic, the association is obviously potent. It enables, as Dr Harnad demonstrated above, to frame research questions i.e. decide whether to investigate (1) or (2).

My own intuition, however, is that answering (2) will come from findings in (1). If (1) addresses "how much you feel", as Dr. Cleermans has done, then it deals with...
report the temperature, reacts to temperature, but in no way it has any knowledge or care about what temperature is.

Did you notice that the thermostat example, at the beginning of the talk, is a reformulation of the Chinese room by Searle (within a closer system). The thermostat can have a case where my having a mental state about X does not make X conscious. Perhaps I am oversimplifying, or missing something.

Consider the following thought experiment:

I see a chair. I thus have a mental state about that chair. The chair itself, however, is not conscious, despite my having a mental state about that same chair. Hence, we have a case where my having a mental state about X does not make X conscious. Perhaps I am oversimplifying, or missing something.

Does anyone find it rather ironic that every time we post here we have to “prove that you’re not a robot”? 

I am intrigued by the idea that consciousness stems from the brain’s constantly re-describing its own state to itself. On Doctor Cleeremans’ account, consciousness would simply be the brain’s nonconceptual theory about itself. While this account is certainly interesting, it falls prey to the same fault as almost every theory examined in the summer school, e.g. it does not address why such recurrent processing would yield felt experience. Doctor Cleeremans’ account makes sense for a computational, information-integration point of view, and yields interesting functional account of consciousness, but does not address why such recurrent processing would yield felt experience. Doctor Cleeremans’ account makes sense for a computational, information-integration point of view, and yields interesting functional account of consciousness, but does not address why such recurrent processing would yield felt experience.
Frederic Simard 24 July 2012 18:39
I meant simpler system.

Frederic Simard 24 July 2012 19:22
Are we really conscious of being conscious at all time? (16:06)

Axel Cleeremans 25 July 2012 00:31
In Rosenthal’s theory, one does not need to be conscious of being conscious to be conscious - the higher order thoughts that do the causal job of making their target representations conscious are unconscious themselves.

Inge Broer 31 July 2012 17:57
... but as soon as you ask someone “are you conscious” they should be able to access the answer “yes”, or in other words: they should be able to become conscious that they are conscious at any given time?

Xavier Déry 31 July 2012 11:58
Cleermans presents four misconceptions about consciousness... There are current scientific studies relying on one or more of these!

VIII. Consciousness and Causality (Saturday July 7)

Simon Baron-Cohen (Cambridge UK) Evolution of Empathy
Alfred Mele (FSU) Do Conscious Decisions Ever Play a Role in Action Production?
Hakwan Lau (Columbia) How to study the functions of subjective awareness?
Luiz Pessoa (McGill) Cognitive-Emotional Interactions
Martha Kiley-Worthington (EEREC, France) Comparing Elephant and Equine Mental Traits, Subjectivity and Consciousness
Axel Cleeremans (ULB, Belgium) Consciousness and Learning

SUMMARY & DISCUSSION, DAY VIII

Martha Shiell 8 July 2012 11:03
One theme that has been re-visited by several speakers is that we need to separate consciousness into its separate parts (ie. visual perception, decision-making, etc.) When we talk about the function of consciousness, it may be clearer to think of the function of each of these types of consciousness as separate, and then afterwards look at the commonalities that underlie these functions.

Stevan Harnad 11 July 2012 15:39
Some of the things we do are felt, some not. Even if we decide to tackle separately each of the kinds of things that we do that are felt, the problem is to explain how and why any of them are felt. Tackling them separately is much more likely to lead us off into explaining the differences between the doings, and begging the question of the feeling.

Pauline Claude 16 July 2012 07:13
Another way to ask why feelings matter... why is sugar sweet? let's think about that...

Andy NDK:
If it would be salty, then we would ask the same question... ;)

Ok seriously: I think this is indeed a fundamental problem, however I have not seen any attempt here or in any discussion to boil it down to a concrete problem, other than just saying yes this is a problem and following Stevan this is a problem not be solved at all. However, I still think we need to transfer that problem into concrete experiments, which will bring us new insights. An example is Synaesthesia: they perceive e.g. an auditory trigger associated with some completely other feeling / phenomenal experience, that of vision. So, the question is what makes a visual stimulus visual, and an auditory one auditory. Does the specific receptor where it originates from responsible for that? Probably not. Does it matter where in the brain it is processed: so everything processed in V1 is visual? What if you would rewire the eyes to the auditory cortex?

Andy NDK:
Is the specific receptor where it originates from... Sorry for my bad language.. My brain is a bit tired meanwhile..

Guillaume Loignon:
Sugar is not sweet by itself, it produced the sweet taste when you taste it. ; If sugar was poisonous, we'd probably say it has a bitter taste.

Pauline Claude:
Sugar is an important component for our body and a precious resource for survival. Sugar feels sweet and pleasant and we simply want to do more what is pleasant. By according sugar such a positive emotional value, it will keep us looking for it. That no more complicated. Emotions helps us looking for things we need by simply making feel es good!
Why emotions are so neglected in this summer school?"

Stevan Harnad
*A neurobehavioral glucostat is adaptive (but it’s just doing). — Why sugar should taste like anything at all is another matter...*

ALEXANDRE ROMANO :
*"I don’t think emotions are neglected in this summer school. In fact, we talked more about emotions than about « feelings » (i.e. the hard problem)."

Pauline Claude :
"I know it doesn’t answer the question why we feel the taste of sugar but I used the word “sweet” because it has a double meaning (especially in English: 1) the fact that it taste sweet, and 2) the fact that it feels good. I wanted to bring up the idea that consciousness was a matter of emotions."

Pauline Claude :
"@ Alexandre : really? can you cite me the speakers who really pay attention to emotions in their talks except Ledoux and Pessoa? I rather have the impression that we often go back to the hard problem again and again."

ALEXANDRE ROMANO :
"Pauline : Armony, Baron-Cohen, at least. But a lot of presentations where about the « easy problems », not about the hard problem directly."

Pascal Riendeau :
"Pauline’s question is a classic one (I recall Cypher from The Matrix asking if the makers got the taste of chicken right), and I beg to differ from Guillaume’s answer: one could very well find something sweet yet not like it, or bitter and like it (just think about beer!). I for one don’t think it’s intractable. Tononi’s modeling suggests that one could differentiate between sensory modalities, submodalities, and even down to the quales themselves. See http://www.ploscompbiol.org/article/info:doi%2F10.1371%2Fjournal.pcbi.1000462
The major problem with Tononi’s model for now is time integration and the computing power required to graph out the Q space. Others have started to try and derive approximate models that require far less computation to render."

Stevan Harnad : 22 July 2012 08:28
DAN DENNETT'S COFFEE TASTERS: MESSRS CHASE & SANBORN
For a discussion of the difference between what something tastes like and whether you like the taste, see the entertaining discussion of the coffee-tasters, Messrs Chase and Sanborn, in Dan Dennett's "Quining Qualia."
But don’t be taken in! That article is about yet another weasel-word: "qualia." Qualia are whatever it is that feelings feel like. We don't need another word.
Feelings feel like whatever they feel like: Only the feeler knows. And tastes taste like whatever they taste like: Only the taster knows.
The taste of coffee is not in the coffee, it's in the taster. Ditto for sugar. You and I may taste the same coffee, but that doesn't mean it will taste the same to both of us (and there's really no way to compare!)
Ditto for whether I like the taste. That's still part of what it feels like to taste it. If I used to like the taste and now I don't, then it now feels different to taste it.
Nothing at issue.
And the hard question -- how and why does anything taste like anything at all -- still begged (though entertainingly).

Xavier Déry : 31 July 2012 11:59
Pessoa makes me think: experiments are like single-cell organisms: replicate or DIE!

Gualtiero Piccinini : Is Consciousness a Spandrel?

Gualtiero Piccinini  Is Consciousness a Spandrel?

video

Abstract: Assigning a biological function to phenomenal consciousness appears to be needed to explain its evolutionary origin. For evolution by natural selection operates on organisms' traits based on the functions they fulfill. And yet identifying the function(s) of phenomenal consciousness has proven difficult. Some have proposed that the function of phenomenal consciousness is facilitating mental processes such as learning or reasoning. But mental processes such as learning and reasoning seem to be possible in the absence of phenomenal consciousness. It is difficult to pinpoint in what way phenomenal consciousness enhances such processes. In this paper, we explore a possibility that has been neglected to date. Perhaps phenomenal consciousness is a spandrel, that is, a byproduct of other traits that has no functions of its own. If so, then phenomenal consciousness has an evolutionary explanation even though it fulfills no biological function.

http://www.ic.edu/users/jensen/spandrels%20of%20san%20marcos.pdf

Comments invited

Posted by Stevan Harnad

18 comments:

Stevan Harnad 8 July 2012 07:06
SPANDRELS, ACCIDENTS AND THE BIG BANG

It's easy to find plausible "spandrels" or accidents, for structures and functions (doings). "Much" harder for feeling itself.

If feeling is a spandrel (or accident), it's a "big" one -- maybe the biggest one since the Big Bang...
I'm curious about why you think that feeling is a big deal (not that I disagree). It doesn't seem to make any difference in the world whether we feel or not. Maybe you have a bias to think that feeling is important because you are a "feeler", the only being to whom your feelings matter?

Feeling is interesting precisely because it doesn't make any difference in the world whether we feel or not, and yet we do. And so the question is: why?

Actually Stevan, I quite like the idea of consciousness as "a big [big big] accident". But there is an even bigger accident since the Big Bang... Isnt life the greatest accident on earth? why consciousness, why life? same question! accidents happens and if we cannot find any adaptive function to consciousness, so why exclude the possibility of seeing consciousness as an accident?

I agree with you Pauline. So many random things put together lead to life. Maybe it's not a "mistake", but it was totally random! As to consciousness, Piccinini said that "all we can do with consciousness we can do without consciousness", he just said that without giving much examples. So many things wouldn't have been invented without consciousness, art, love, etc. Would altruism exists in species that we expect not to have consciousness? So I'm not convinced about the idea that our consciousness have no function therefore it's a spandrel, I think there is much more studies needing to be done about that.

"Isn't life the greatest accident on earth? why consciousness, why life? same question!"

I disagree. Many of the questions we are asking during this Institute are rooted in an implicitly accepted theory of evolution, whereby selection is guided by adaptive function. The question of "why life?" pertains to an altogether other domain of inquiry.

Stevan, I agree that if feeling is a spandrel or accident, it's a big one, in the sense that feeling is a big deal to us. It's the most precious part of us; without it, in an important sense, there wouldn't really be an "us"!

But then again, as Martha points out, it's not clear that feeling makes any difference. That's where I'm coming from. Personally I think and hope feelings makes a difference, but I find this an extremely difficult thing to establish.

I should add that that this argument I just gave is intended to show that consciousness (if epiphenomenal) could indeed still be a spandrel, but could not be considered an evolutionary accident.

Stevan, I agree that if feeling is a spandrel or accident, it's a big one, in the sense that feeling is a big deal to us. It's the most precious part of us; without it, in an important sense, there wouldn't really be an "us"!

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But, if you adopt supervenience:
1) the physical properties, that are the supervenience base of epiphenomenal properties, ARE causal (they cause other physical events)
2) the physical properties thus DO have effects on which natural selection can operate
3) the physical properties (the supervenience base) can be selected for
4) the epiphenomenal properties that supervene on them, come with them (selected indirectly), despite not causing anything themselves

Pietro, thanks for your comment. The problem with your argument is that not all physical properties of an organism are selected for. Some of them may be acquired accidentally, e.g. by genetic drift. If phenomenal consciousness supervenes on those, then it's an accident.

I agree with Dr. Piccinini that there are a lot of theories but little (if any) evidence to really show that p-consciousness serves any function. I concur and believe (maybe because I am a neuroscientist) that it is a neural event, a physical thing. It does not seem readily apparent to me how one can show that, but I guess one will never find out unless one tries?

The argument that all the living organisms can do consciously (and especially what humans can do consciously) could also be done without consciousness is probably a mistake that might be the result of a misunderstanding of the principles underlying evolution, especially if we see consciousness as a spandrel. In fact, one of the important principle in evolution is that evolution works with what already exists. So if consciousness appeared by mere chance at some point in evolution but was completely neutral with no reason to be "selected against" or eliminated by natural selection and that for some other reasons (such as the fact that it appeared to be a characteristic found in individuals that developed another adaptive trait or by mere genetic drift for instance) it remains through the evolutionary time, evolution had to cope with this "parasitic" feature that could eventually be used to increase the adaptive properties of other adaptive functions that do not actually necessarily need consciousness to be a minimum adaptive.
Adele Tufford  8 July 2012 21:03
Watch out Dr. Piccinini, there are retinal neurobiologists in the audience. Your analogy of retinal architecture as an evolutionary spandrel has a serious oversight...
It is now well established that the mammalian retina is arranged “inside-out” due to the presence of both the retinal pigmented epithelium (RPE) and intrinsically photo-sensitive retinal ganglion cells (ipRGCs). ipRGCs (a special subclass of retinal neuron) sit closer to the light source than traditional rods and cones, in order to absorb ambient light in the red spectrum. These cells drive both circadian rhythms and the pupillary light reflex. If RGCs were to sit at the back of the retina, pointing their axons away and absorbing the need for a blindspot, our rods and cones (and the RPE that comes along with it) would absorb the portion of ambient light required by ipRGCs to drive the aforementioned low level visual responses.

The RPE, located at the back of the eye, is absolutely essential for human colour vision in it's ability to exquisitely regulate the behaviour and survival of rods and cones. We couldn't have the RPE anywhere else on the eye, because, well, it would block all light - then we would really be seeing very well at all...

We compensated for this seemingly 'inverted' arrangement by evolving binocular vision. Yeah, if we lose an eye we might have some problems in the visual field. Coincidentally, if we lose a lung, we might have some problems breathing. In the words of WakeUpIhea тебе111, “Duh.”

Do you have any other salient examples of evolutionary spandrels?

Gualtiero Piccinini  11 July 2012 14:49
Adele Tufford, thanks so much for your helpful comment. Based on what you say, the hole in the vertebrate remains a spandrel, i.e. a byproduct of the arrangement you describe. But the arrangement you describe, it seems, is not an accident, contrary to what I suggested in my talk (although it's still not clear to me why the axons have to point towards the eye; I'm just going to assume that there is a reason for that). So what I need is a different example of evolutionary accident. Anything generated through genetic drift will do.

Stevan Harnad  11 July 2012 15:36
Even if we are satisfied that feelings just happened as a big, useless accident (I'm not), it doesn't explain how doings become feelings. There is an explanatory problem whether or not we believe feelings confer an adaptive advantage.

Alexandre Duval  16 July 2012 17:34
During the question period, Diego Mendoza raised the following objection: all cases of evolutionary by-products are simple and since phenomenal consciousness is complex, it would be extremely unlikely that it is a spandrel. I think there was really something to his argument even though using the word 'complex' might have weakened his point a bit. (Dr. Piccinini simply denied that p-consciousness was complex.) Let me try another formulation: there are two aspects of p-consciousness that seem to suggest that it is something highly organized that could neither be a by-product or an accident: (1) Our p-conscious perceptual states are well-integrated across sensory modalities; if we see a pig in front of us, we hear it grunting, we smell it and we touch it, we perceive these features as belonging to the same entity, not as five different, unrelated features of the world. (2) Our p-conscious mental states often carry information that is needed to plan our actions over longer periods of time (which is a process that forces us to integrate very different kinds of data — e.g. our knowledge of weather conditions, of other people’s intentions, of the danger associated with certain decisions). On the other hand, they usually carry little information regarding the internal states of our organs — except when one of our organs is severely damaged and we feel pain. For instance, our p-conscious perceptual states carry information about the objects lying on your path, the people that surrounds you and the color of the sky, but not about the approximate number of white cells you have in your body or whether certain neurotransmitters have been emitted in your brain. The content of our p-conscious mental states are thus often used to make incredibly complex decisions about our future that requires us to weigh an indefinite number of factors against one another. Yet, when it comes to serious issues about our bodies (which require our brain to weigh a specific set of pre-determined factors against one another), the state of our internal organs is not part of the content of our p-conscious mental states.

Laurence Dumont  29 July 2012 19:18
I found Dr. Piccinini’s talk really interesting but I can't help but have a difficulty with the concept of spandrels... I find that saying that something is a spandrel, an accident or a byproduct of something comes up only when we don't find any compelling story for a trait or feature. An absence of evidence is not an evidence of absence and I find that such evolutionary explanations fall easily in this trap.

Frédéric Banville  5 August 2012 08:45
There is another trap: coming up with a seemingly convincing or “plausible” story for a trait that turns out to be a “just-so” story.

Take, for example, jealousy. David Buss comes up with a plausible story about how jealousy is a natural and evolved trait. I'm overly simplifying his argument here, but basically the idea is that because of sexual competition and because males “invest” in a mate, they are perfectly rational when they're being jealous. This of course can be read in a number of ways, one of which is that it legitimizes jealousy-based behaviors, “because it's just how we're wired.” But really, this whole argument is based upon assumptions about the environment of evolutionary adaptedness. And yes, we need to make those assumptions at some point, but they need to be backed up by empirical evidence, lest we find ourselves trying to decide which story is the best based on their apparent plausibility. The point here is that trying to find a plausible story for any and all traits humans exhibit can lead to methodologically unsound proposals.

Another point to consider is that saying a given trait is a spandrel does not amount to saying it doesn't have a function. There are numerous different selection processes at work in evolution, one of those being exaptation, by which a trait is co-opted to fulfill another function than the one it was selected for OR by which a trait with no prior function acquires one.

So, saying consciousness is a spandrel does not mean it has no function. Furthermore, assuming it is a spandrel BECAUSE so far we haven't found a plausible adaptive function for it will enable us to avoid unsound or uninteresting evolutionary explanations. evolutionary explanations are very powerful, but they do come with a number of methodological problems.

Malcolm MacIver : Sensory and Motor Spaces and the Emergence of Multiple Futures

Malcolm MacIver  Sensory and Motor Spaces and the Emergence of Multiple Futures

Abstract: Back in our watery days as fish, we lived in a medium that was inherently unfriendly to seeing things very far away. The technical way this is measured is the “attenuation length” of light through the medium. After light travels the attenuation length through a medium, about 63% of
the light is blocked. The attenuation length of light in water is on the order of tens of meters. For a beast of a meter or two in length, which moves at a rate of about a body length or two per second, that’s a pretty short horizon of time and space. In just a few seconds, you’ll reach the edge of where you were able to see. If you’re down in the depths at all, or in less clear water, you may reach the edge of your perceptual horizon in about a second. In this talk, I’ll explore the quantification of sensory and motor spaces, developed through our work on the weakly electric fish, a popular model system of sensory neurobiology. I discuss the relationship between behavioral control and the relative size of these spaces. Finally, I’ll discuss whether emergence on to land, where the attenuation length of light is essentially infinite, may have been a key step in producing favorable conditions for the evolution of the ability to plan over multiple possible futures.

Why Did Consciousness Evolve, and How Can We Modify It? http://blogs.discovermagazine.com/sciencenotfiction/2011/03/14/why-did-consciousness-evolve-and-how-can-we-modify-it/
Neuroethology From Morphological Computation to Planning http://www.neuromech.northwestern.edu/publications/MacI09a/MacI09a.pdf
Omnidirectional Sensory and Motor Volumes in Electric Fish http://www.neuromech.northwestern.edu/publications/Snyd07a/Snyd07a.pdf

Comments invited

Posted by Stevan Harnad

17 comments:

**Stevan Harnad** 8 July 2012 08:38
**THERE IS NO "ACCESS" CONSCIOUSNESS**

There is only one consciousness: feeling.

"Access" refers to whether or not information (data) is accessed.

If the accessed information is felt, it’s conscious.

If the accessed information unfei, it’s not conscious (hence no kind of consciousness)

If the information is not accessed, it’s not accessed.

**Peter Fugger** 8 July 2012 20:56
Thanks for this clarification. For me it was not clear what access consciousness should really mean.

**Malcolm MacIver** 9 July 2012 05:25
So in this scheme, would there be feeling, and then different feelings such as being in the world (like a fish in the water), and the feeling of future choices enabled by long range high resolution imaging (this would be two varieties or contents of consciousness)? That does seem cleaner, and clearer.

**Stevan Harnad** 11 July 2012 15:29
There are 2 different questions: (1) How/why do organisms feel anything at all and (2) how/why do they feel this rather than that. The hard problem is (1). If/when (1) is answered, (2) becomes another of the "easy" problems: correlations between brain states and felt states (Dan Dennett’s "heterophenomenology"). But without an answer to (1), (2) is just weather-forecasting and hermeneutics!

**Andreas Kalckert** 8 July 2012 08:59
I like the idea that jump on land had these consequences in terms of the sensorimotor capabilities. I am wondering if that fish "just" uses that electric sense to detect/ sense the prey or put it in a different way: how much do lower animals actually perform multisensory integration / processing. This is related also to The first comment from Matt I think: could that jump to land living also have promoted the integration of vision and audition, so to perform a more multisensory representation of space? Do fish or other lower animals have multisensory regions?

**Malcolm MacIver** 9 July 2012 09:35
No, multisensory integration is a big deal in these brains. Colleagues have shown neurons that multisensorily fuse different varieties of electrosense, electrosense and vision, and electrosense and lateral line. Likewise in other fish brains.

However, it is still the case that changing the properties of any of the modalities will have its neuronal repercussions, and big changes happen with big changes in lifestyle - such as from water to land, or from land to air, or water to air. This will result in different requirements for multisensory integration.

**Martha Shiell** 8 July 2012 11:16
Electric fish are a great example of the embodiment problem that Edelman mentioned in one discussion. It is difficult to imagine consciousness is like through a sensory system with which we have no experience.

**Malcolm MacIver** 9 July 2012 16:05
This one of the reasons people were initially attracted to the system. The thought was that with no native sense that maps on to what electrosense is like, we’d be less prone to make mistakes of the naive introspection variety when it comes to reasoning about sensory processing.

**Pauline Claude** 8 July 2012 18:40
Thanks to Juliette for her comment at the end of Malcolm’s talk. That was quite a relevant and actually a very fundamental one: we behave a certain way because it is adaptive, but surely we do not behave one way or another because we know it is adaptive. Understanding why we behave one way or another relies on the ultimate level of explanation and this level cannot be neglected if we want a complete understanding of it. That’s why, as least as much as the other levels of explanation (physiological, ontogenetic and phylogenetic), the ultimate bases of behavior is more than worth studying.
Jennifer Mather : Evolutionary Pressures and Cephalopod Consciousness

Jennifer Mather Evolutionary Pressures and Cephalopod Consciousness

Abstract: On the face of it, cephalopods are unlikely candidates for consciousness, even at a primary level. They stem from slow, simple molluscan ancestors, but during evolution they have lost the protective shell. Likely in the competition with bony fishes, they have instead developed a centralized brain, acute vision, complex control of arm movement and a stunning skin display system. But unlike other non-human animals with well developed cognition, they are not social. What would the evolutionary pressure be, then, for these animals to develop consciousness? The answer may lie in the complexity of their near-shore marine environment. Mobile cephalopods must search this environment to find prey, and octopuses do so with a saltatory search technique. At the same time they are vulnerable to predators and have an array of defenses, from camouflage to false eye spots and ink release to flight, to avoid or react to them. Yet they are mobile, and the cephalopods move to a new home range every ten days or two weeks so they cannot store information and responses to form automatic loops. It may be this constant change and pressure to update that caused the cephalopods to develop a simple form of consciousness.
Philosophical background of attitudes toward and treatment of invertebrates http://research.tamucc.edu/compliance/iacuc/PDF/ILAR%20Journal.pdf#page=91
[See also David Edelman reference list]

Comments invited

Posted by Stevan Harnad

27 comments:

Shady Rahayel  8 July 2012 09:03
Constructing our world on the basis of things that aren’t necessarily there: that’s also a very interesting way science should be looking at the world. We always use specific stimuli to induce consciousness, what for those stimuli present but not specifically shown?

Jennifer Mather  11 July 2012 10:24
There actually has been a little of this. I don’t remember the details, but someone presented illusory features to an animal—likely a vertebrate like a rat. The animal did construct the figure like we would (ie seeing the triangle), this would be a very interesting way to test the construction of a ‘mind’. Would the octopus see a Kanizsa figure? I don’t know.

Stevan Harnad  8 July 2012 09:10
I’m certainly not a “social consciousness” proponent, but for the “non-social” octopus there is still the “social” interaction of courtship/mating, as well as predation and predator-avoidance.

(Please note that we do not have any scientific evidence that octopuses have consciousness. This is based on anecdotal evidence and personal experiences.)

Jennifer Mather  11 July 2012 10:29
Yes, I don’t think of the octopus (or the squid) as social just because it manages to overcome its aversion to conspecifics and mate. The squid is a little bit different, in that it hangs around in groups of animals about the same size, like what we think of as fish schools. But there’s no cooperation, and they will eat smaller squid if they get them at the right disadvantage. No parental socialization, no teaching...not really social.

Stevan Harnad  11 July 2012 12:34
Pain is felt, and it’s not social.

Jennifer Mather  12 July 2012 14:23
That’s the trouble with that word, it has too many and too broad meanings. And there’s an active debate whether inverts ‘feel’ pain or ‘sense’ noiception.

Inge Broer  31 July 2012 19:22
With regards to pain, isn’t there the conceptualization that there is an emotional, a cognitive, and a purely sensing component to it?

I don’t know all that much about it, but if you could manipulate the “anticipation” factor through conditional learning or something and thus also manipulate the response to a same stimuli... would that show that the pain is felt rather than only sensed?

Stevan Harnad  2 August 2012 17:10
All three “components of pain” -- emotional, cognitive and sensory -- are felt. Otherwise they are not pain, just robotic detection, processing, and responding.

Andreas Kalckert  8 July 2012 12:28
From that what I heard now so far about the octopus it is a nice example that certain cognitive functions might develop in different life situations depending if there is a certain need to cope with similar problems, like the raven and ToM. I never expected to think about the consciousness in cephalopods, but I mean this is why we are here right. Also, I think that following those observations we go back where and when something like the conscious experience developed during the sensorimotor interaction with the environment.

Jennifer Mather  11 July 2012 10:31
That's why I think they are so important, they represent a different model of at least the progression to consciousness (I find it easy to see them as having 'access' consciousness).

Carey YL Huh  8 July 2012 17:01

Dr. Mather,

Your illustration of the cephalopod's camouflage and home-finding capacities was so striking that I don't think I will ever forget it. It will be very interesting to find out the neural mechanisms of the spatial memory in these animals, as it is clear that they have highly developed sense of where they are, were, and will be... given that we understand a lot about rodent spatial memory, it will be interesting to compare these mechanisms subserving similar functions and find out the different ways evolution has come up with to deal with a similar problem.

Another question: I am an open water diver, where would be a good place to go to try to spot some octopi? :) 

Thank you!

Jennifer Mather  11 July 2012 10:36
Yes, I think that solving the problems of navigation is necessary for animals of different phyla and cognitive capacity. The book I read was Animal Thinking, editor Randolph Menzel and Julia Fischer, based on a Strungmann forum.

Any place that animals are relatively protected is OK for finding octopuses. I find them in Bonaire, in the Caribbean, because the near shore is all marine park. And I find them by the garbage heaps of shells outside their homes.

Pauline Claude  8 July 2012 19:21
Jennifer's talk was absolutely stunning!

Her octopuses illustrated brightly the “cleverness” (if I can say so!) of evolution but it also illustrated that every single thing evolution "created" has its intrinsic purposes and no detail of the relevant components of the environment is left behind.

Evolution allows organisms to cope with their environment as a whole. The complexity of the environment an organism lives in has to be reflected in the complexity of the organism itself and especially in the complexity of its behavior.

To come back on the argument that social factors might have enhanced the development of human higher cognitive abilities, humans probably developed some of their cognitive abilities in response to a physical complex environment well before their empathic abilities which are probably the result of the complexity of their social environment. Actually human encephalization began well before the complexification of social interactions. That might actually be encephalization, and therefore, a slower development of human babies that influenced the complexification of human social interactions, the latter would also explain the emergence of ToM.

Jennifer Mather  11 July 2012 10:41
There's a paper on foraging strategies of one of the fruit-eating monkeys. They have to remember, like the octopuses, how to find their way ot to food and back to shelter. But they also have to remember what rain forest trees are fruiting or flowering at what time, and what cues tell them the fruit is ready... then how to get it and maybe how to compete with others for it. There's lots to learn and remember for primates, I suspect therefore that the pressures for evolution of intelligence were dual.

Louisa Dahmani  8 July 2012 20:02
Dr. Mather,

I was very surprised by the octopus' sophisticated navigation system. I was wondering if you could give us some details about how it achieves it. Does it have an ability for path integration where it integrates the vectors of the path taken and can infer the vector that will get it back home? Or does it use cue-guided/topography-guided navigation? It would seem that the octopus' sophisticated visual system would be useful in supporting the latter type of navigation.

Jennifer Mather  11 July 2012 10:44
There has been little testing of octopuses on this, just a bit by Jean Boal. However there's more on cuttlefish. In a l-maze they can use visual cues for guidance or they can use the vector (right or left turn). And it's sometimes different by sex, Crystal Alvez in Caen did that work.

Louisa Dahmani  11 July 2012 17:03
Thank you, I will check out those references.

Adele Tufford  8 July 2012 21:10
Thanks for a fascinating talk!

I've been thinking about whether or not the octopus chromatophore system could be under volitional control, or whether it is an engrained reflex mechanism. How would the octopus camouflage effect perform in a 'stimulus-free' environment, as Bjorn Brembs used to test free-will in his flies?

If we put an octopus in a stimulus-free tank and measured the 'behaviour' of its pigments, and they turned out to show non-random patterns, would you say this is evidence of chromatophore free-will (or volitional control over pigments - possibly as some form of language as you briefly suggested), as Brembs suggested for his flies?
I think we're better off seeing it as a motor output system that has control at different levels (as we have reflexes and conscious movement). So the camouflage is pretty low-level, countershading in cuttlefish is reflexive. When you keep an octopus in the lab, it gets rather dingy, maybe the low light levels tune down the camouflage. But think of the squid that can aim a sexual display on one side of its body and an agonistic one on the other. That has to be volitional.

Considering that it seems to have been claimed earlier in the discussion that squid or octopi are not very social, it is interesting to this example of 'volition' (the aim of different colours on the different sides of the squid for different goals). If this is not a reflex, it appears to indicate a social component, on one side a social aspect related to the mating ritual and on the other a defence against danger. There also seems to be a sense of volition, do all of these contribute to consciousness? Would a sense of agency be needed to qualify this volition as part of consciousness? How could we ever know if the squid has a sense of agency? Would there be any way to test this?

Also, I found the coconut example so cool! It definitely seems to me as though there is some kind of future planning happening in that case.

This is a beautiful example of why we need lab work as well as field observation. Yes, the alternates need to be tested.

The coconut example was quite striking! I am not sure that the octocopus 'coconut-seeking' ability could qualify as instinctual behavior though. For a given species to develop a purely instinctual behavior involving objects of a certain type (e.g. birds who use twigs in order to build their nests), individuals of that species must be in frequent contact with objects of that type at some point in their evolutionary history. Birds could not have developed their twig-gathering instinct if they seldom saw twigs (or something that looked like twigs) in their environment. So, unless octopi were in frequent contact with coconuts in their environment (or something with a similar appearance that they could recognize visually) at some point in their evolutionary history, then it seems unlikely that they developed instinctual behavior to reach for coconuts. It seems more likely that this impressive feat was the result of higher representational abilities (involving anticipation).

It's always hard to figure out where a particular piece of behaviour came from. I suspect that octopuses have a 'drive' to seek shelter. When I tested some ages ago (under Dr. Mather mentioned, cephalopod's evolved from molluscan ancestors with protective shells. In this light, one could legitimately perceive the coconut-seeking ability as an adapted and modified shelter/shell seeking instinct.

But again, whether or not a behavior is instinctive or deliberated upon, it changes nothing to the fact that that behavior can be felt OR not.

Dr. Mathiers talk was fascinating! I was particularly interested by the spatial navigation in octopuses observed through foraging patterns over several days. I was curious about the long range navigations abilities of the octopus. How far can are they able to travel for foraging and return home? Also, what type of navigational cues do the animals use to navigate foraging?

Eva Jablonka: Evolutionary Origins of Experiencing

Eva Jablonka  Evolutionary Origins of Experiencing

Abstract: An approach focused on the evolutionary transition to experiencing -- to the first organisms with phenomenal consciousness -- can enable the identification of fundamental organizational principles involved in experiencing. Based on the heuristics of the origin-of-life research, we outline a parallel approach to experiencing, and suggest that just as function emerged with the transition to life, felt-needs emerged with the transition to experiencing. We argue that experiencing is a facet of open-ended associative learning in neural animals with a CNS, and that the evolution of associative learning was a key factor in the metazoan diversification during the Cambrian. Endowed animals with motivation and increased their discrimination powers on the basis of systemic reward systems. Tracking the molecular and neural correlates of associative learning as they emerged during evolutionary history may therefore shed light on the dynamics that underlie elementary forms of experiencing.


Comments invited
Posted by Stevan Harnad

21 comments:

Stevan Harnad 8 July 2012 12:29
MODES OF BEING?

(1) "Experience" is (another) weasel-word: Is it felt experience or unfelt experience? If it's felt, it's feeling. If it's unfelt, it's a teapot (doing).

(2) The analogy with life, vitalism, and the eventual functional and evolutionary explanation of life -- doings: causal and complete -- does not work for feeling, because with life there is nothing more, and never was anything more, that could be its "vital force" that (allegedly) made it a "hard" problem to explain life causally in the usual way (doings). With feeling there is something more, and each one of us knows exactly what it is.

(Probably the reason vitalists were vitalists was because they were actually animists, and the "vital force" they had in mind (literally) was feeling.

Pierre Boucher 8 July 2012 19:38

1. I don’t think that experience is a weasel word. She defined it as feeling at the beginning of her talk. Dr. Jablonka decided to use a different word to put forward her theory in your words feelers.

2. (How do you know that if we explain all the doings that we won’t get feeling? How do you know that there is not some neural mechanism that converts information into a feeling? What we have yet to discover is that mechanism. And if I understood correctly Dr. Jablonka is interested in finding exactly that mechanism using her approach of studying very simple experiencers. Or in your words feelers.

Eva Jablonka 8 July 2012 20:45

Eva Jablonka:

1. “Feeling”, for most people, captures mainly the affective aspect of experiencing, so we decided to use the word experiencing, which we think works better and includes both affective and perceptual aspects. Our teaching experience suggested that feeling misleads the students while experiencing does not, and is intuitively understood as phenomenal consciousness. Experience is not the simple unqualified equivalent of information processing. It is a very special type of information processing, just as living is a very special type of chemical reactions.


Evan Thompson (2007) has a long and very good discussion of this issue in Mind and Life (especially chapter 8-10).

Martha Shiell 8 July 2012 13:30

I missed the logic behind how unlimited associative learning necessarily requires consciousness. Can anyone summarize?

Carey YL Huh 8 July 2012 16:42

I am with you in not getting this point. I agree with one of the people that asked questions at the end, that it is a bit of a circular logic. Dr. Jablonka looked at which organisms COULD potentially have consciousness, put together a behavioural function these animals can do in common, ie. ‘unlimited assoc. learning’ as she defines it. And called that a criterion for consciousness and listed a bunch of neural correlates that could serve this function. She does stress this is her attempt at some type of criterion and that she doesn’t know if she is right... it is just a theory, a bit like the global workspace theory except that the workspace can now do learning!

Eva Jablonka 8 July 2012 20:47

Eva Jablonka

We propose that the core property of unlimited associative learning in neural animals is the formation of rich, memory-dependent, ontogenetically-constructed, integrated sensations and coordinated actions. The relation between unlimited (that’s very flexible) associative learning (UAL) and experiencing is evolutionary: we argue that in biological organisms, the evolution of associative learning entailed experiencing because UAL involves a set of dynamic processes and organizational properties of the embodied nervous systems, that led to what we call categorizing sensory states (CSSs). That is why UAL is a good indicator of experiencing in animals (not in robots). In our papers we explain this position in some detail and point to the biological preconditions that enabled it, and the properties that are facets of UAL: binding, memory at several level, temporal synchronization, hierarchical mapping and meta-representations, compensatory and inhibitory mechanisms, embodiment, etc. (see ppt). The functions of UAL in animals, as well as the organizational dynamic properties enabling UAL are in line with what we see as the functions and basic characteristics of phenomenal consciousness (experiencing).

Of course our suggestion is a theory – but it has interesting predictions and suggest new avenues of research, for example, identifying the physiological (not just neural...) of UAL, and experimenting with this aspect of "doing", to mention just the most obvious ones.

Martha Shiell 17 July 2012 07:38

Thank you for the reply!

Stevan Harnad 22 July 2012 03:59
CORRELATION VS CAUSATION
Shaun Maxwell 8 July 2012 15:01

On the question of the simplest type of systems that can have goal: the identity of some kinds of systems depends on their own activity. The identity of a (token) wave, for example, rests on how matter and energy pass through it, as with a flame, or the red spot on Jupiter. Unlike a rock, such process structures are distinguished from their surroundings by a characteristic pattern of activity. If the pattern ceases, so does the system. This is a necessary but of course not a sufficient condition for a system to have a telos. Other conditions include that the system be auto-catalytic (thus unlike regular waves, but not standing waves, self perpetuating under certain conditions), but not, perhaps, that it be able to replicate or evolve.

When we attribute any sort of telos to the simplest living systems, we presume these are un-represented, and of course unconscious goals. We say things like "the bacteria is trying to maintain a certain concentration of x within its membrane". If we make the same sort of claim about a self-organizing process structure (such as the Bernard phenomena, the red spot, or a star) are we making a claim that is more ontologically problematic than when we do so in the case of simple living systems? Some sort of information transfer system (e.g) may also be necessary condition for a system to have a goal, but this was not made clear in the talk (perhaps due to lack of time), and it is certainly a claim that needs explicit support if we are to draw the line between non-living process structures, and those that are alive.

Eva Jablonka 8 July 2012 20:48

I did not indeed have time to discuss the complex issue of teleological systems. However, there is no doubt that self-organization is not the same as teleological processes at least not according to the way most philosophers of biology think. A very good book about this is: Juarrero, A. (1999). Dynamics in Action: Intentional Behavior as a Complex System. Cambridge, MA: MIT Press.

See also: Thompson Evan 2007 Mind in Life, Harvard University Press.

Stevan Harnad 11 July 2012 12:31

GOALS: FELT AND UNFELT

A thermostat has a "goal": Keep the temperature at 22 degrees.

A cold organism has a felt goal: Do something to make you feel warmer.

Goal is a weasel-word, insofar as discussions of consciousness are concerned, because it comes in both varieties: felt and unfelt (as in a teapot).

Eva Jablonka 11 July 2012 15:29

Goals, like feeling are loaded words. All the words we use need to be qualified. Systems exhibiting life and mind behave in an intentional, goal-directed manner. Dennett's intentional stance is a way of expressing this property of dynamic organization, which is applicable to all living organisms and to all products of organisms (such as robots) that show a goal-directed behaviour. Mayr (1982, The growth of Biological Thought, p.47) suggested that when an entity has a goal which is guided by a plan it displays teleonomic activities. Hence a robot has teleonomic activities, just as does the amoeba, or the thirsty dog, since it is designed according to a plan or a program. So the intentional stance and the ascription of teleonomy applies to robots as well, and of course to thermostats. However, there is a big difference between living organisms and entities designed by living organisms like thermostats: the goal is not intrinsic to the robot or the thermostat, so there is a fundamental distinction between these entities with extrinsic and intrinsic goals (Kant's third critique of teleological judgment was devoted to this issue). The books to which I referred provide an in-depth analysis of these issues which are central to the philosophy of biology. Felt needs are new types of goals, which appeared in living biological organisms in the context of the evolution of learning (open-ended, flexible associative learning). At later stage of evolution, with the evolution of symbolic language, new goals emerged, the kind of values to which humans (sometimes) strive.

Stevan Harnad 22 July 2012 04:05

ORIGINS

Yes, robots are designed by people and organisms are designed by evolution. But what difference does that make, and how does it explain that organisms feel (e.g., goals) and robots don't (if they don't, even at T3 level!!)

If we have a functional mechanism that can do certain things, what difference does its origin make -- i.e., whether it grew on a tree or was crafted on a workbench?

Shaun Maxwell 8 July 2012 23:31

Thanks for the references Eva. I have read some of Thompson, but had not heard of Juarrero or looked at Mind in Life, which looks to be right down my alley.

I agree that self organization does not, in and of its self, directly engender teleological properties. But I have argued (drawing on likes of Maturana and Varela, Prigogine, and Millikan) that such properties only arise in systems whose identity is maintained over time by a characteristic cyclical exchange of matter and energy with the local environment. Such systems cease to exist if they fail to control this exchange. It is in their need to do so that, I think, we find a necessary (but perhaps not sufficient) basis for the attribution of the most basic sort of normative properties, in the form of homeostatic goals or values.
Crucially though, such properties are only apparent when one take the system's "point of view," and thus conceive of it as a kind of agent. As Searle has argued, part of what makes the problems of both intentionality and consciousness so difficult to tackle with objective, scientific methods is that we are dealing with properties that result from the existence of particular, and therefore necessarily subjective, points of view. I think the explanation of origin of normative properties suffers from a similar sort of conundrum, and that finding the right way to conceive of this dilemma will be crucial to any satisfactory account of the evolution of consciousness. Thus, while I agree that the capacity to integrate information from multiple sources is, plausibly, necessary for conscious experience to occur, we won't understanding why this may be the case until we have a better grasp of how all forms of information are agent dependent, and that this integration is integration by and for individual agents and or their progeny.

Maxwell J. Ramstead 15 July 2012 09:02

I think Doctor Jablonka's approach is extremely interesting. I am partial to enactive and autopoietic conceptions of cognition and experience; IMHO, she gives an excellent account of how something as complex as representational cognitive states could emerge from inanimate matter.

However, I do find that it shows the same incapacity to address the mechanisms of felt experience. It is not at all obvious to me why associative learning should be felt. Indeed, if one postulates that felt sensations arose, and thereafter were retained for adaptive purposes, one nevertheless has to address the question of why and how such felt experience should occur in the first place. In answer to my question, Doctor Jablonka said that feeling is a kind of doing. Such a doing would be an overall, integrated, persistent, embodied, and categorizing sensory state, that has evolved as a facet of associative learning. It is interesting to speculate, as she does, that once feeling becomes commonplace, it should become the "new telos" of biological systems; however, this is not an explanation of how or why feeling evolved.

I believe Doctor Jablonka gives an intriguing explanation of how complex cognition could evolve from an autopoietic point of view, but that she doesn't address the problem of how and why felt experience arises per se.

Pauline Claude 16 July 2012 05:26

To which extent associative learning would be related to consciousness? or in other words, would associative learning be possible without any kind of phenomenal consciousness?

Eva Jablonka 18 July 2012 00:54

Associative learning (AL) and even unlimited (i.e. very flexible) associative learning (UAL) does not entail experiencing. Clearly we can make robots who can manifest UAL and they are not experiencing being. Nor are genetic algorithms, which are implemented in some computer programs, making these programs living entities. Such programs are indeed unlimited heredity systems, but only in a biological system, in the context of the actual evolutionary history of life, they are (according to Maynard Smith and Szathmary ) a criterion for living. Similarly UAL entails experiencing in the context of the evolution of animals, animals that are endowed with various preconditions characteristics (such as multicellular organization nervous system, possibly cephalization, adaptive plasticity at several levels including basic learning mechanisms etc.).

Only in the context of such organization, in which we argue UAL had actually evolved, does it make sense to argue that UAL entails experiencing; in other words, for UAL to evolve in animals, a lot of complex biological features have to be presupposed; the same is true for unlimited heredity – in a biological system, unlimited heredity can only evolve which has certain autopoietic properties. The fact that we can technologically implement some process (such as unlimited heredity or UAL) which is formally analogous to a biological process in artificial systems can be (sometimes) quite illuminating, but it is certainly not telling us how analogous process occurred in biological evolution. Searle is making the same point in his talk.

We realize that the dynamical description of experiencing we can offer is at present rather limited, and it is our job to flesh it out. However we think that the difference between experiencing/feeling and neural-embodied dynamics is not a category difference that cannot be bridged. Just as living is not categorically different form certain organizational autopoietic (e.g. chemotony) dynamics. We think that once the dynamical organization that entails experiencing will be clarified we shall understand experience in these terms. What we suggest is not such a model but we believe that UAL is a good tool with which we can try and progress in constructing such a model, because we think that it is a good candidate for a complexity threshold. Note that complexity threshold is a criterion not a model. Moreover, there is a big gray area, and it may well be the case that experiencing in a very limited sense appeared earlier (for example, already in crikidants), but the early version were limited and could not evolve any further without additional evolutionary innovations involving new memory processes, which led to UAL to the global yet specific categorizing sensory states we call CSs which enabled animals to discriminate, predict and be motivated to act. We shall be able to say more when we have better embodied dynamic models of experiencing.

Stevan Harnad 22 July 2012 04:12

THE LOGIC OF ENTAILMENT

"UAL entails experiencing [only] in the context of the evolution of animals… endowed with various precondition characteristics (such as multicellular organization nervous system, possibly cephalization, adaptive plasticity at several levels including basic learning mechanisms etc.)"

Why?

Laurence Dumont 29 July 2012 16:40

It is a shame Dr. Jablonka's talk didn't come sooner in the summer school. I found that having her ideas in mind as a framework while going through my notes and watching some of the talks again really put things back in place.

I do have a question regarding the possible consciousness of "not alive" entities that show associative learning. How can we be sure that biological beings are the only ones that can feel? Maybe I am getting something wrong or not understanding though...

Izabo Deschenes 30 July 2012 20:07

I really like the idea of comparing the search for the defining criteria of consciousness with the historical search for the defining criteria of life. Perhaps, when we define all the 'doing', 'feeling' will be explained, the same way there is no vital force. It is hard for me to think that consciousness would be more than a or multiple neural event. But I suppose even if we do fully define it, we have still not explained the why or how, just the what.

When rethinking about this talk, I also was wondering along the same lines as Laurence Dumont: What would it take to attribute consciousness to a non-biological being? Is lifebeing alive a criterion of consciousness? Could a robot achieve unlimited associative learning? Is there any reason to believe it couldn't?

Stevan Harnad 5 August 2012 17:31

What would it take to attribute consciousness to a non-biological being?

T3

Is lifebeing alive a criterion of consciousness?
No, but so far it's an invariant correlate

Could a robot achieve unlimited associative learning?

Yes.

Is there any reason to believe it couldn't?

No.

IX. Evolutionary Advantages of Felt Functions (Sunday July 8)

Stefano Manzoni (University of Udine, Italy) : Evolution of Plant Intelligence CANCELLED

Quahtaro Fujisawa (Doshisha University, Japan) : Consciousness and Cephalopods

Malcolm MacIver (Lethbridge) : Sensory and Motor Spaces and the Emergence of Multiple Futures

Jennifer Mather (Northwestern): Evolutionary Pressures and Cephalopod Consciousness

Evolve Jablonka (TAU, Israel) : Evolutionary Origins of Experiencing

SUMMARY & DISCUSSION, DAY IX

13 comments:

Pauline Claude 10 July 2012 20:06

Ethics: a matter of feelings or a matter of feeling that feelings matter?

Pauline Claude 10 July 2012 20:11

COMMENTS COPIED AND PASTED FROM THE CORRESPONDING POST ON FACEBOOK:

Stevan Harnad : "What's the difference? (And it's more like feeling that the feelings of "others" matter. You have not much choice about your own -- which is why it is not possible to commit suicide by holding one's breath...)

Pauline Claude : "When you say "feeling matters", it means that whatever teh feeling, when it is provoked to an animal or another human, this feeling matter for the animal/human threatened, and therefore, this act that provoked this feeling shouldn't have been done because of the only fact that feeling matters for the animal/human threatened no matter whether or not this feeling will really have an impact on the animal/human (e.g. hurting a drunk individual who will not even remember he has been hurt except maybe if a physical scarf can testify it). However, when you say "feeling that matters", this is no longer the fact that the animal/human actually feels something but rather the fact that the potential "pain giver" that you might feel something at that precise moment while you are drunk but you don't even remember you felt anything, whatever you felt during that period of time, it absolutely don't matter to you (so can we really say "only feeling matters"?), however, the feeling felt by the potential "pain giver" that you might feel something at that precise moment while you were drunk was actually the only feeling that really mattered (so it would be like saying "feeling that feeling matters".)."

Stevan Harnad : "MOINEAU SANS TÊTE SAUCE CHASSEUR

No, I would say feeling matters because feelers can be hurt (regardless of whether they remember it afterward): it matters "while" they are hurt whether or not they remember that was the scopolamine childbirth example during the Searle/Raz/Plourdus discussion.

I would also say that the feelings that matter for ethics are the negative ones (hurt): No quantity of orgasms compensates for a fallen sparrow -- least of all when the orgasms are not even the sparrow's. So if we stay on the negative side of the ledger for ethical matters, the only conceivable justification for feelling a sparrow is that it would spare many more sparrows (or people) hurt. (But there is no such justification for moineau sans tête sauce chasseur...)

Pauline Claude : "Actually Stavan, I was asking the question "a matter of feelings or a matter of feeling that feelings matter" regarding the "memory component" as a resulting of thinking of my own experience. I've been dramatically burnt as I was 2 years old. I guess it was very painful considering the scarfs al over my legs, but I don't have any single idea of this pain because I don't remember any single form of pain I had that day. So for me those feelings don't matter AT ALL because I can't say they really happened. So, I did the same reasoning for the animals. If they are hurt but don't really know they have been hurt, does it really matter? Animals such as dogs and cats probably have this memory but what about animals that do not really have an episodic memory? in that case if you decide to not hurt that kind of animal, the only thing that would matter would be the fact that you feel that only the feeling really matters and not the fact that feeling matters for the animal itself."

Stevan Harnad : "But Pauline, multiply your example by 100: 100 2-year-old children are before you, and you have a choice whether or not to burn them. It will hurt now, but they will forget, forever, tomorrow. I think the answer is obvious, whether or not they are your own children. And especially if the reason for burning them is to taste Moineau sans tête sauce chasseur. (Same reasoning applies to whether to use scopolamine as the "anaesthetic" for childbirth: what matters is not remembered pain, but pain, even if only while it is happening.)

I would add another observation, about the locus of the pain, and the decision. You yourself are of course free to say, today, that you will submit again today to a pain like the (forgotten) one from your childhood burn, on condition that you will forget it afterward. (You may have occasion to regret that decision, during the pain, but that regret, too, will be forgotten.) However, the decision will be yours, based on your own feelings about your own pain. But when it comes to the sparrow (etc.) it is "you" making the decision -- whether based on theories concerning forgotten pains, uncertainty about the other-minds problem, or gastronomic pleasures -- about the "sparrow's" pain.

I wonder if you see the self-other disparity, indeed incommensurability here. It is as big the pain/pleasure disparity, at least in the case of the sparrow's pain and my pleasure; I might be able to trade off burns against orgasms if the feelings are all my own, but not when the pain is the other's."

Pauline Claude : "So, from what I interpret from your comment on scopolamine is that this is actually not the "feeling that matters" but the fact that we "feel that only feeling matters" (whatever the feeling really does matter for the "victim" who don't even remember what happened during her altered state of consciousness) which would come back to say that it is the feeling of the potential "pain giver" that matter and not the animal's real feeling. That's why lions don't have ethics : they don't feel that feeling matters when they kill their prey although the feeling does happen."
For the second part of your comment. Again my example was here only to bring the memory component in the case of animals (and maybe also for the anesthesized persons as you described or any other similar cases of altered consciousness, but not in the case of a child whose consciousness is not altered at the time of the threat), but not for that precise case (I know I made quite a tricky shift in my resoning, but I do it all the time and sometimes it can appear to be problematic at some point). I surely won't burn a child even if I know he won't remember it several years later. I won't burn him because I feel that feeling matters. Anyways, the child example is a bad one because if I don't remember my pain at 24, I surely remembered some sort of it the days/months following the accident, so at some point in my life it probably did matter.^

Pauline Claude 10 July 2012 21:37
TURING CONSCIOUSNESS (Stevan Harnad ):

"Feeling always matters to the pain-getter; one hopes the feelings of the pain-getter matter to the potential pain-giver, if only because, by the Golden Rule, every potential pain-giver is also a potential pain-getter. (And, apart from that, one hopes that most of us are not sociopaths -- or in the sociopathic thrall of theories about other-minds uncertainty or pain forgettability.)"

Pauline Claude:

"Feeling always matter for the pain-getter, I agree. But the reason why the potential pain-giver might retain his action is that because he feels that feeling matter, and because he don't want to be the one who inflicted pain to the target. As long as that person will feel some kind of relief when thinking that he avoid an animal to be hurt, it seems to me that the statement "only feeling matters" would be a bit hypochotical, and that's why I think that saying that what matters in ethics is the "feeling that feeling matters" would be a bit more appropriate. There's always a bit of selfish in human behavior even in things like ethics. And again, as long as you are not able to detect the other's pain (or an animal's pain), you won't never be able to do such a thing as giving rights to animals. What is weird though is why displaying an empathic behavior toward non-conspecific. If this behavior is part of human behavior, it has to be adaptive for humans. And if it is adaptive it has to benefit to humans. As long as it benefits to humans, this behavior has to be at least a bit selfish. That's why I keep wondering whether only feelings matter (which would mean that the ethical behavior would be entirely altruistic. Unfortunately, complete altruistic behavior in living beings does not exist, for the only reason that living beings behave as the result of adaptations set by natural selection."

Stevan Harnad 11 July 2012 12:21
KIN KINDNESS

(1) "Feelings matter" covers all one's feelings -- those about oneself and those about others. Feelings about feelings are feelings.

(2) The truism that everything one does voluntarily one does because one feels like doing it is not very informative, because it is mostly tautology.

(3) Yes, evolution is based on selfish genes, but inclusive fitness (feeling like helping one's kin, especially progeny) is based on selfish genes too (and may perhaps be part of what makes us feel empathy toward strangers and other species: they look and behave like our babies and our kin, and we don't have genetic kin-detectors, just familiarity and similarity as cues to who's who to us).

Pauline Claude 16 July 2012 07:06
Pauline Claude

"(1) Feelings about feelings are feelings, I agree. But what about feelings other's might be feeling but are actually not felt by the subject (eg. someone who doesn't feel pain, or someone who is hypnotised or anesthesied)? If it is the feeling that really matters, why do others care about feelings that don't even exist in an individual's subjective world? Which come back to my previous statement saying that caring about other's feelings is purely selfish and what matters is not the subject's feelings but the observer's feelings when it comes to talk about ethics.

(3) Familiarity detection: why in human this similarity detection would extend to such a range of human-unrelated things? Yes, we don't have kin's detectors and we interact all together through mechanisms based on similarities, exactly as other species do. But to my knowledge, I don't think other species are able to translate their similarity detection mechanisms to species very different from them as humans can do."

Stevan Harnad 02 July 2012 07:43
THE SOCIOPATHY OF THE BLIND WATCHMAKER

Feelings matter to the feeler, including when the feeler's feelings are about the feelings of another feeler. Because feelers are not really mind-readers, their feelings about the feelings of other feelers are based on the other's doings (Turing Test). So what? Doings are a pretty good predictor of feelings. And both feelings and feelers matter only to feelers. The only thing that "matters" to evolution (the Blind Watchmaker) is doings (survival/reproduction). Evolution is sociopathic. Altruristic doings (especially toward kin, and those that resemble them) are easily explicable evolutionarily: Altruristic (or sadistic) feelings -- or any feelings at all -- are not.

Of course the only feelings a feeler feels are his own. But if eating sweets matters to the feeler (and not just, evolutionarily "matters" to the doer) then so does feeling empathy.

Pauline Claude 16 July 2012 06:24
COMMENT BASED ON A PREVIOUS POST OF MINE ON FACEBOOK:

When one wants to understand the whole mechanisms underlying a specific behavioral phenomenon (such as consciousness) and factors that influence it, it is necessary to study its four different levels and have a complete understanding of it. Those four levels are the physiological level (proximal level), the ontogenetic level (developmental level), the phylogenetic level (evolution across species) and the functional level (ultimate level).

However, some of these levels are often neglected or omitted, making unable the combination needed for a whole and complete understanding of a phenomenon. Although the quality of the talks, the speakers and the organization is perfect, this summer school did not escape this general observation: where are the ontogenetic and even the phylogenetic level? Those were barely, if not, tackled. Even more striking, how can we follow a 10-days summer school on evolution and function of evolution without even focus on those points? I know some speakers tried at some point to do so, but it was always with some reserve and was always approached briefly. It seemed to reflect the lack of inter-disciplinary data integration in general in the scientific world.

I think that if we do experiments and write papers on a scientific way, nothing can completely be contradictory, and that if it seems contradictory, it is surely because of unattended factors that has not been discovered yet. That's why I don't think that anything that has been said so far was completely contradictory, we just need to find the the way to explain how they can fit all together, and that's is probably one of the greatest challenge of science.

Pauline Claude 16 July 2012 06:26
REPLY ON FACEBOOK:

Pascal Rendeau

"You're refering to Tinbergen's four questions. Burghardt (1997) suggested adding the subjective (1st person, phenomenological) level in 'Amending Tinbergen: A fifth..."
aim for ethology": I think what we saw in this summer school was both a reflection of what fields are "hot" at the moment, and what quality speakers were available. I find that we've had an excellent lineup so far, the summer school didn't have the pretense of covering everything equally. Unless one flies around the world to follow all conferences on the matter, one is unlikely to get as broad of a coverage we got I think (even ASSC tends to be much more focused in specific fields, Etienne can correct me if I'm wrong)."

**Pauline Claude 16 July 2012 06:28**

**DISCUSSION STARTED ON FACEBOOK BY Frederic Simard :**

"What if phenomenological consciousness not something but the answer to a philosophical need to rationalize what can't be rationalized, just like the invention of Gods. (I don't mean to offend anybody's belief, therefore I'm referring to sun gods found in ancient religions) After all, isn't everything possible through access consciousness?"

**Pauline Claude 16 July 2012 06:37**

Frederic Simard :

"The development of the idea of phenomenological consciousness wouldn't then be a result of the mix of human's strong logical analysis with human's strong imaginative capabilities. A day dream, nice try though.

Thierry Lauron

*And what if consciousness would be the emergence of quality upon quantity through synchrony or information integration?*

I can't help myself on always referring phenomenological consciousness of something to quality, as depicted in this book: http://en.wikipedia.org/wiki/Zen_and_the_Art_of_Motorcycle_Maintenance

I see consciousness as quality emerging from quantity.

Sense/feel, Empirical/romantic, universe/cosmos and other dichotomous views of the world should be combined to really understand the word investigated.

Just a though. :)

Frederic Simard :

*Correct me if I'm wrong: a quality is a subjective perspective... What is a quality to one, might be a defect to the other. I'm not trying to trap you, but just to develop your point.

However, synchrony is a physical property of dynamical systems in general, and information integration is more related to access consciousness than phenomenological consciousness. Nice though.

How could we define the "quality" of being phenomenologically conscious?"

Frederic Simard :

"But again, speaking in those terms lead me to ask doesn't that relate to what I was saying, phenomenological consciousness is not real, it's just an impression we have and we are trying to make a sense of it...

It's just like asking why is a rose beautiful... because it smells good, wrong sense... because of the physical configuration of its petals... yeah, but what about it? because ladies like to receive them as gift, practical reason... but again, Stevan could ask why is it beautiful??"

Thierry Lauron :

*Being phenomenologically conscious permits quality, without quality being an empiric concept, at least, from my point of view, which is only ituition, not fact. I would say that the quality of being phenomenologically conscious would reside in the distance an observer takes from an object and have a feeling of, from the representations/ perspective he has of it now compared/compressed/ differenciated from personal comparisons of objects categorized in the same/other categories of similar objects seems/felt in the past. From that integration, he can feel the quality of the moment, the object, the context and so on. I'm not sure that information integration, in that perspective, is more related to access consciousness than phenomenological, since the subject having a quality "moment" is in "what it is like to feel" that moment/object/context in terms of quality. But like said precedentely, this is a though/intuition, not a fact. More like my perspective of consciousness. Maybe just another semantic game, but this is the way I see phenomenological consciousness.*

**Pauline Claude 16 July 2012 06:38**

ROCK-ANDRE BLONDIN :

"Quality is essentially a part of our identity. It's our way to define in what we believe and in what we don't believe.

Human's all have a need to socialize to be part of a group and defining our world qualitatively is a way to answer that need. When you decide to like something or to adopt a certain way of living you it's because you need to feel it's new to be identify to this.

Science is also a human invention a way to rationalize the world that surrounds us and it's as important as phenomenological consciousness is."

Frederic Simard :

"Well said!

Combining your two text I would like to ask. Is phenomenological consciousness required for decision making (admitting some kind of free will) or is it there for us to appreciate what is happening or enjoy the show, I could say?

And the same question, but this time without any free will, the person's behavior is entirely determined in a brain process incoming information in regard to past history? (conscious perception happens after neural correlates of decision-making)

Thierry Lauron

*I think that phenomenological consciousness is essential to create, in a qualitative kind of way AND enjoy the show you are actually creating yourself. Action, feedback, emotions: reentrence in the processus. This kind of processus cannot actually exist without free will. At least, the way I think it actually take place in the way I fell it when doing so, in a qualitative perspective.

I have difficulties in having this perspective in mind and subtract free will of such experience. But lets say its feasible, I don't think that the result of such creation will have a feeling effect for the creator itself. For others, its difficult to say.*

Thierry Lauron

*But yeah. I think that most of our actions can be completed without phenomenal consciousness, BUT without enjoying the show. I think that free will has effects and exists, and that it was actually proved on epigenetic researches. I mean, you have to do a BIG choice to chance completely from what were your patterns, the way you were raised in every single ways. Same debate here from nurture and culture. But I think that with phenomenological consciousness, free will has a real sense of changing one's way of living, which can actually has impacts on one's life and then, epigenetic, which chances the chain of reactions...*
Intelligent behavior is a complex adaptive phenomenon that has evolved to enable organisms to deal with variable environmental circumstances. Maximizing fitness requires skill in foraging for necessary resources (food) in competitive circumstances and is probably the activity in which intelligent behavior is most easily seen. Biologists suggest that intelligence encompasses the characteristics of detailed sensory perception, information processing, learning, memory, choice, optimisation of resource sequestration with minimal outlay, self-recognition, and foresight by predictive modeling. All these properties are concerned with a capacity for problem solving in recurrent and novel situations. I will review the evidence that individual plant species exhibit all of these intelligent behavioral capabilities but do so through phenotypic plasticity, not movement. Furthermore it is in the competitive foraging for resources that most of these intelligent attributes have been detected. Plants should therefore be regarded as prototypical intelligent organisms, a concept that has considerable consequences for investigations of whole plant communication, computation and signal transduction.

It should not be surprising that neuronal computation is not limited to animal brains but is used also by bacteria and plants. It is generally assumed that brains and neurons represent late evolutionary achievements which are present only in more advanced animals. But recent data suggest that our understanding of bacteria, unicellular eukaryotic organisms, plants, brains and neurons, rooted in Aristotelian philosophy is flawed. Neural aspects of biological systems are obvious already in bacteria and unicellular biological units such as sexual gametes and diverse unicellular eukaryotic organisms. Altogether, processes and activities thought to represent evolutionarily 'recent' specializations of the nervous system may be ancient and fundamental cell survival processes.

Stefano Mancuso: Evolution of Plant Intelligence

Stefano Mancuso  Evolution of Plant Intelligence

Unfortunately, Professor Mancuso had to cancel his trip in the last minute for personal reasons, but here is a TED video that gives the flavour of his work. Comments are still invited, on his video and on the linked readings. It is possible (though not certain) that Professor Mancuso will reply to the comments.

Abstract:
Intelligent behavior is a complex adaptive phenomenon that has evolved to enable organisms to deal with variable environmental circumstances. Maximizing fitness requires skill in foraging for necessary resources (food) in competitive circumstances and is probably the activity in which intelligent behavior is most easily seen. Biologists suggest that intelligence encompasses the characteristics of detailed sensory perception, information processing, learning, memory, choice, optimisation of resource sequestration with minimal outlay, self-recognition, and foresight by predictive modeling. All these properties are concerned with a capacity for problem solving in recurrent and novel situations. I will review the evidence that individual plant species exhibit all of these intelligent behavioral capabilities but do so through phenotypic plasticity, not movement. Furthermore it is in the competitive foraging for resources that most of these intelligent attributes have been detected. Plants should therefore be regarded as prototypical intelligent organisms, a concept that has considerable consequences for investigations of whole plant communication, computation and signal transduction.

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Response to Aldi et al.: Plant neurobiology: the gain is more than the name - TRENDS in Plant Science 2007http://www.linv.org/images/about_pdf/Trends%202007%20Brenner.pdf


Comments invited

Posted by Stevan Harnad

17 comments:
The accelerated images showing plant development over time also pointed out that we are usually not aware of the complexity of our familiar environment. The transitions and differences highlighted between day and night plants’ behaviors were interesting. So was the complexity of their movements. Plants have developed the capacity of surviving in moving environments by integrating this changing information with the evolutionary constraint of being rooted. We could learn a lot from their complex sensory mechanisms.

To see more on the behavior of plants, there is also this longer (44 min) documentary: http://www.cbc.ca/natureofthings/episode/smart-plants-uncovering-the-secret-world-of-plant-behaviour.html

Both the TED and the CBC documentary point out the apparent complexity in the ‘behaviour’ of plants. I agree that the patterns of the root branches growing and looking for nutrients and the target-specificity of the daughter parasite plants are surprising/interesting. But I do not think that they show anything more than an automatic response. Roots grow towards a greater density of nutrients in the soil. The daughter plants picked up on the volatile chemical cues from the tomato plants. These instances just mean that plants are highly sensitive to these cues and respond by growing towards them. The same can be said about the sunflower moving to face the sun. Sure they are “smart” plants as in they are pretty adaptive but do they experience things? What I was interested in, though, is the action potentials measured in the roots...

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Where will we ever draw the line? What is NOT conscious? We all agree that inanimate objects are not conscious (Or do we...Dr. Harvey would disagree). A plant seems inanimate to most lay observers. But, as in Dr. Mancuso’s TED talk, accelerated plant behavior shows movement, simply at a scale that we, as a human beings, are not usually attuned to. Now, because we know plants move, are we not more likely to allow for some form of plant consciousness? If so, it would seem that movement is an implicit criteria for our attribution of consciousness. Why? Because this is how we attribute consciousness to other humans as well - by observing patterns in their behavior (which are made up of movements) and by comparison with our own patterns of behavior we know result from being in certain mental states.

Suppose we look at planetary movement. The solar system certainly moves. Is it conscious? Of course not! But why not? I am not saying that movement is the sole criteria we use to attribute consciousness - far from it - but I am having difficulty understanding what exclusion criteria for consciousness remain if plants are deemed conscious.

The answer cannot be just a just-a-so story.

Where will we ever draw the line? What is NOT conscious? We all agree that inanimate objects are not conscious (Or do we...Dr. Harvey would disagree). A plant seems inanimate to most lay observers. But, as in Dr. Mancuso’s TED talk, accelerated plant behavior shows movement, simply at a scale that we, as a human beings, are not usually attuned to. Now, because we know plants move, are we not more likely to allow for some form of plant consciousness? If so, it would seem that movement is an implicit criteria for our attribution of consciousness. Why? Because this is how we attribute consciousness to other humans as well - by observing patterns in their behavior (which are made up of movements) and by comparison with our own patterns of behavior we know result from being in certain mental states.

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The answer cannot be just a just-a-so story.

Don’t tie yourself up in knots. Until further notice, biological organisms on earth are conscious (feel): Tempests and teapots do not. And whether an organism feels anything at all or not (ever) is all or none: It either does or it doesn’t. Doing is “movement,” and it is indeed via doing (hence movement) that we can mind-read whether or not something feels (that’s the Turing Test).

But none of that is the hard problem: The hard problem is explaining why and how organisms feel, rather than just do.
as we do. There was no evidence of any subjectivity. I can't yet imagine the adaptive advantage of subjectivity as opposed to strictly reactionary responses for a plant, which has little need for internal representation and contextualization for the behaviours exhibited by plants.

Noemi Stern 25 July 2012 08:19
This topic really intrigues me and I'm disappointed that we didn't get to see Mancuso present (although I hope everything is okay with him!). This kind of topic really brings up some interesting ethical questions for me – how do we decide/define which beings are killable? Are we only okay with eating plants because they are further removed from our state of being, or do they not have consciousness/feeling and therefore it is okay that we eat them?

Stevan Harnad 2 August 2012 19:18
GOODNESS AND GOURMANDISE

GOODNESS AND GOURMANDISE

I hope plants don't feel. If they do, it does not follow that we should all starve ourselves to death.

The moral argument for veganism is that one can live healthily without eating animals, so if we insist on killing them for food, we are doing it for the taste, not out of necessity.

And for those of us who would like to think of ourselves as decent and humane, that is not a very decent or humane way to live and act.

But if plants did feel, it would mean that vegans still have to eat them, not needlessly for the taste, but necessarily, to survive.

But, please, let us keep things in proportion. There are billions of animals, about whom we can be sure they feel, being bred and butchered daily, just for our tastes. We first need to fix that obvious abomination, before beginning to ponder the far-fetched possibility that plants, too, might feel.

That said, when I look at what used to be a forest, clear-felled for lumber -- or even see a large, noble tree, chopped down, I know we are doing something terrible, if not to a feeling creature, then to a noble and beautiful environment. (Some will reply that that is only a matter of taste -- and if trees really don't feel, I suppose they are right...)

Alexandre Duval 29 July 2012 08:53
What empirical evidence does Dr. Mancuso have for claiming that root apexes work in networks in order to share information? In the TED talk, he does not provide any data which shows that they do in fact interact with each other and that they share substantive information in a way that could justify ascribing them abilities to communicate and to play, as Dr. Manuso does.

Izabo Deschenes 29 July 2012 17:50
Why aren't plants conscious? What criteria are they missing?

Perhaps a question that could help would be to ask why plants didn't develop/evolve consciousness? What makes them different from other biological/living beings (although having developed such complex and adaptive behaviour)? Does anyone think that plants could/will ever develop consciousness?

As Dr. Harnad mentioned whether plants have consciousness or not is not the hard problem and does not explain why and how organisms feel, but maybe in understanding why it did not evolve in certain organism, such as plants, might help us understand why it did in others.

Thinking of Dr. Floreano’s evolved social robots and comparing their ‘level’ of consciousness or of not being conscious yet, would something have to be biological to have consciousness or is that just part of our bias as living beings? Would we be quicker to accept a plant as having evolved consciousness than a robot? I will have to look this up, but has plants’ complex sensory systems and behaviours ever been modelled in robots?

Inge Broer 31 July 2012 18:33
Interesting questions. Like you, it brings up a question like: Can consciousness exist without the organism being alive?

Is life a pre-requisite for consciousness? If so, why?

Is life a pre-requisite for consciousness? If so, why?

Is life a pre-requisite for consciousness? If so, why?

What is it about life that is important?

Stevan Harnad 2 August 2012 19:26
THE MEANING OF “LIFE”

Actually, the question with plants does not seem to be whether life (i.e., being a biological organism) is necessary for feeling (it probably is) but whether it is sufficient for feeling (i.e., do all biological organisms feel?).

Of course, if a Turing robot (T3) is possible, and feels, then being a biological organism is not even necessary for feeling. (To argue that a feeling robot is not “alive” is as vacuous as to argue that an organism is not a “machine.”)

Alain Ptito Neural Mechanisms of Blindsight after Hemispherectomy: Tapping into the Unconscious

Alain Ptito Neural Mechanisms of Blindsight after Hemispherectomy: Tapping into the Unconscious

Abstract: Hemispherectomy subjects (Hs) have offered a unique opportunity to study the role that subcortical structures play in blindsight because the hemisphere contralateral to the blind field is absent or non-functional. We first showed Hs could detect and localize simple targets which shows that they do in fact interact with each other and that they share substantive information in a way that could justify ascribing them abilities to communicate and to play, as Dr. Manuso does.
conscious perception, however, a specific synchronized activation pattern of different cortical areas involving ventral, parietal and frontal visual areas simultaneously and yet are able to work independently of each other (as is the case following a circumscribed lesion in a visual cortical area). For possibility for the lack of awareness may lie in the lack of synchronicity in cerebral activation. The human visual pathways process information semantically and yet are able to work independently of each other (as is the case following a circumscribed lesion in a visual cortical area). For conscious perception, however, a specific synchronized activation pattern of different cortical areas involving ventral, parietal and frontal visual areas is believed to be crucial. Our results indicate that Hs with 'Type I' or 'attention-blindness' are able to enhance visual performance in their blind field, but remain unaware of visual processing presumably because they are unable to access a more complex synchronous cortical activation pattern involving higher top-down mechanisms necessary for conscious vision.

Neural substrates of blindsight after hemispherectomy http://unfweb.criugm.qc.ca/~doyon/cours_6032/Neuroscientist%202007.pdf

Unconscious vision: new insights into the neuronal correlate of blindsight using diffusion tractography http://brain.oxfordjournals.org/content/129/7/1122.full


The nature of consciousness in the visually deprived brain http://www.ncbi.nlm.nih.gov/pmc/articles/PMC3111253/

Comments invited

Posted by Stevan Harnad

10 comments:

Stevan Harnad  9 July 2012 06:37

What do the blindsight patients say it feels like when they successfully detect or localize a stimulus they cannot see. What is the cue?

Carey YL Huh  9 July 2012 18:27

I guess what the patients are reporting is the feeling of cells firing in the superior colliculus (and of those in downstream visual areas). Why this particular activity is required for the typical kind of visual awareness, perhaps?

Alexandre Duval  10 July 2012 15:39

Hi Alexandre, I did not mean literally that the patient was feeling his SC cells firing! I was just merely speculating that the feeling may be made up of his SC cells firing. This just follows from the assumption that we can equate a neural correlate with a certain feeling. I personally buy this assumption but I am pretty neuro-centric!

Carey YL Huh  10 July 2012 19:43

Didn't a previous speaker say that when they successfully detect a stimulus patients feel a little bit like how they feel when they sense that someone is behind them? I'm not sure we could describe the 'cue' in any other way than by comparative descriptions of this kind. I would be especially surprised if they reported that they have a feeling of cells firing since we never feel our own neurons firing. We can never track our neuronal activity through introspection.

Alexandre Duval  11 July 2012 07:36

Sorry, my bad! I certainly don't want to take issue with that assumption.

Pauline Claude  16 July 2012 05:19

In my opinion, blindsight as presented by Alain Ptito is a good example to illustrate the fact that consciousness is everywhere and that it is relevant to question the relevance of consciousness in terms of adaptive function by taking examples as blindsight. By everywhere, I mean it seems to be present in any kind of behavior of our repertoire.

The example of blindsight has often been used to questioning consciousness and the fact that some abilities we thought to be completely conscious-related didn't actually necessarily need consciousness to be effective. And therefore consciousness was not really adaptive. However, in the case of blindsight, it seems to me that if the conscious feeling of a visual stimulus is absent, there's still a feeling that there is something. So even if what matters is not the feeling of having seen something (the feeling of having consciously perceived something), there is something that matters, a kind of unexplained feeling. Even if it seems to be unconscious, there's always a kind of feeling at some point.

That being said, can we still say that consciousness has no adaptive function if it has to be present at some point or another for an individual to behave properly? In the...
case of blindsight, only a tiny proportion of the "normal" consciousness is gone, but the other chunks of consciousness related to all our other abilities are still there and can compensate for the part of consciousness that can be defective (such as in blindsight). That's why I think it might be a mistake to questioning the relevance of consciousness in terms of adaptive function based on these kind of cases.

And what if consciousness was completely gone? It would probably correspond to a comatose state. But as far as I know, a comatose individual can hardly improve his/her fitness as long as he/she remains in that state...

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Stevan Harnad 22 July 2012 03:32

**NEUROSCIENCE, ROBOTICS AND CAUSAL EXPLANATION**

This is why part of the puzzle about the causal role played by feeling comes not just from neuroscience but from robotics: Even if feeling is inextricably (but inexplicably) correlated with doing in organisms, it clearly is not in the case of robots. So why can robots do what they can do without feeling, while in organisms the doing is correlated with feeling?

The question would of course become even more pointed if a robot could pass the Turing Test (T3) -- but the important thing to remember that the question would remain equally unanswered whether or not the T3 robot would feel: If it did not feel, we would not know what causal role feeling played, and if it did feel, we still would no know. (Of course, as with organisms, only the T3 robot would know whether it felt, if it felt, but that's just the other-minds problem, not the hard problem.)

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Nico Shepard-Jones 19 July 2012 20:40

Seeing the movie clip of the patient with alleged blindsight navigate the obstacles in the testing room made me think of sleepwalking. To what extent are vision during sleepwalking and blindsight similar/different?

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Laurence Dumont 29 July 2012 16:26

Seeing the video from the patient, I wonder how the transition between being aware of objects in the visual field and being unaware (of having a different experience to report than the one we have) is felt by the patient. Are they anosognosic?

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Xavier Déry 31 July 2012 12:01

Sometimes, in the morning I feel only half my brain is working. According to Ptito, it's normal that I feel great nonetheless!

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Gilles Proule: General Anesthetics for the Study Consciousness

**Abstract:** Although general anesthetics have been used for more than 150 years and suppress consciousness in a predictable manner, their mechanisms of action are not fully elucidated. Numerous studies have been devoted to understanding how general anesthetics impair consciousness in human subjects using either functional brain imaging or electrophysiology. These studies have obvious relevance for the study of consciousness, particularly for consciousness as a waking state and in regard to self-awareness. They have revealed the critical involvement of the thalamus and offered evidence supporting the hypothesis that the anesthetized state is associated with loss of connectivity and attenuation neuronal oscillations in the high-gamma range. In this lecture, I will first review the aspect of the pharmacology of general anesthetic that are essential to appreciate the possibilities that these drugs offer to study consciousness as well as their limitations. In the second part, I will summarize the main findings that emerge from the literature.


Critical involvement of the thalamus and precuneus during restoration of consciousness with physostigmine in humans during propofol anaesthesia: a positron emission tomography study [http://bja.oxfordjournals.org/content/106/4/548.full]

Comments invited

Posted by Stevan Harnad

17 comments:

Shady Rahayel 9 July 2012 08:53

The way G. Proule conceives unconsciousness makes me wonder if his definition would also include sleep as being an unconscious state? Most people know that sleep stages are not unconscious states (e.g., dreaming). If one person is not answering back after being asked to close his eyes, would it really mean that they person is unconscious, knowing now that she just can be asleep?

What if anaesthesia, through all the substances, was a more profound state of sleep? This would mean that anaesthesia wouldn't be an unconscious state at all. On the other hand, the cerebral blood flow studies presented suggest that anaesthesia and sleep present with different patterns of metabolism.

Louis Chartrand 9 July 2012 08:12

People actually respond to stimuli in sleep. Besides, do you think all of sleep is conscious? Sure, when you dream, you are, but what about dreamless sleep? General anesthesia certainly is dreamless.
Carey YL Huh 9 July 2012 19:43

Dr. Plourde presented an interesting dissociation between long-term memory and consciousness. His anecdote about talking the whole time (thus seeming conscious) while he was under sub-anaesthesia and not remembering any of this episode afterwards is similar to the situation of patient HM who was clearly conscious (feeling/thinking/talking) but could not remember afterwards what he felt/thought/said. In the memory literature, it is widely thought that the hippocampus is required for long-term memory consolidation. That would suggest that the hippocampus is somehow knocked out first before the cortex during sub-anaesthesia! I will be interested to see brain-imaging during such a state to see if this is indeed true. Same goes for hypnosis that leads to spontaneous amnesia.

Alexandre Duval 10 July 2012 10:49

I think Dr. Plourde’s anecdote (and Carey’s description of HM) provide us with a pretty strong argument that consciousness need not require anything like long-term memory or even – something that was suggested by some students before – a capacity to create an autobiographical narrative of the moments during which you are conscious.

It seems to me that people who make claims that consciousness requires such things do so often because they want to undermine the feeling/doing distinction. Their argument would be that because it is so intrinsically related to memory (and memory is a kind of doing), consciousness is also kind of doing. But, as these examples show, their argument clearly cannot work.

Gilles Plourde 13 July 2012 12:27

There are many similarities between (slow wave) sleep and anaesthesia, and that includes cerebral blood flow changes (see N Franks’ review in Nature Neuroscience). The main difference between sleep and anaesthesia is that you cannot be aroused back to consciousness from adequate general anaesthesia by sensory stimulation.

By the criterion of response to commands, I think that subjects are unconscious during slow wave sleep and that they become progressively conscious of their environment as they emerge from sleep following sensory stimulation. This applies only to slow-wave sleep.

There have been reports of dreams during general anesthesia, usually during emergence at the end of the procedure. See K Leslie, Dreaming during Anesthesia and Anesthetic Depth in Elective Surgery Patients: A Prospective Cohort Study, Anesthesiology 2007, 106pp 33-42

Finally, I think that consciousness can occur in the absence of long-term memory.

Maxwell J. Ramstead 14 July 2012 12:35

This kind of approach to consciousness raises the interesting question of how felt experience is related to long-term memory. Indeed, Doctor Plourde’s anecdote seems to hint toward the possibility that phenomenal consciousness need not be linked to long-term memory. It does illustrate, however, that a coherent sense of a narrative self does necessarily involve long-term memory.

Perhaps using a distinction such as the “I” of felt perception versus the “me” of continuous, lived experience might be helpful for understanding such anecdotes. Indeed, if dreams can occur during anaesthesia, then perhaps such processes do not actually turn consciousness “off”, as it were, as much as they tamper with higher-order memory and information integration. Studies of anaesthesia in particular might help shed light into the ongoing construction of the sense of self in relation to memory and conscious experience.

Nico Sheppard-Jones 16 July 2012 11:02

I came across the following article:


The authors draw a distinction between responsiveness, consciousness and connectedness. One, naturally, is all three when awake. During REM sleep, one can have disconnected consciousness (through dream), but be unresponsive. An individual who is sleepwalking can be disconnected, but show spontaneous responsiveness to environmental/sensory stimulation. Following anaesthesia, but preceding administration of the paralysis-inducing neuromuscular blockade (Dr. Plourde, please correct me if I misunderstood this), one can prevent paralysis of a specific body part (e.g. by using an inflated cuff on the arm). Patients undergoing anesthesia with the so-called ‘isolated fore-arm technique’ show no spontaneous responsiveness, but do obey to goal oriented commands (e.g. squeeze my hand - I assume, in contrast, that they would be unable to open their eyes). In such instances, the authors deem that the person, despite being spontaneously unresponsive, is still consciously ‘connected’.

I thought these were useful distinctions for better understanding ‘consciousness’.

Shady Rahayel 29 July 2012 11:12

There might be several similarities between slow-wave sleep and anaesthesia. However, in comparison to REM sleep (where most of our bizarre dreams occur), anaesthesia is very much different. Anaesthesiologists’ definition of consciousness is too much linked to language abilities (whether in oral expression to say that you are conscious or in oral comprehension to understand someone asking if you are conscious). REM sleep is not an unconscious state because people cannot say that they are conscious (and thus respond to external stimuli: REM sleep dreamers do not respond to external stimuli, unlike in slow-wave sleep): the brain is fully activated, the person is dreaming (vividly, more imaginatively than in any other circumstances, etc.). The person is indeed under some kind of consciousness.

Pauline Claude 16 July 2012 03:48

Consciousness as presented by Gilles Plourde was really interesting because is asked the question "what does it really mean to be conscious". According to Gilles, an individual is considered to be conscious as long as he/she responds to an external stimulus such as "open your eyes". But, he also mentioned that the time following the anesthesia was often a period of confusion for the patient and it seemed to me that consciousness could not be considered as black or white and should rather be considered as a continuum with a kind of "semi-conscious state" where consciousness is still there but the individual cannot be really considered as fully conscious. In that situation, what does really matter? what you feel when you are fully conscious or what you felt when you are in any state of consciousness? and if we can more or less distinguish between several levels of consciousness, what about other cases of altered consciousness such as being drunk, or under drug’s effects? are these people really "conscious of what they do"?

Laurie-Anne Dion 24 July 2012 10:59

I thought it was very interesting to distinguish, in imaging studies, what is the unconscious state and what is the consequence of this unconscious state. The thalamus is a very important structure for the relay of information to other structures. Thus, if it is affected by anesthetic drugs, it will affect indirectly other structures.
It is something to take into account in all brain imaging studies and especially when we study consciousness since it involves many brain areas.

Jennifer Robinson  24 July 2012 21:18
Dr. Plourde mentioned that in fMRI studies general anaesthetics result in an overall reduction of activity, with significant reductions in the occipital, parietal and particularly in the thalamus. I was curious if there is any connection between damage to these regions, particularly the thalamus, and coma patients who never regain consciousness?

Laurence Dumont  26 July 2012 18:10
I think Plourde's definition of consciousness is too simple, even if probably really useful in the anesthetics world. If we define consciousness as "being able to respond to external commands" where does the locked in syndrome stands? (in the brain signal, yes, but such criterion was not included in the scale presented in the talk). Also, the period of confusion that seems overlaps Plourde's barrier of consciousness is quite puzzling to me. Even if the content of consciousness isn't properly articulated during this period and memory of it can be brittle, it seems to me as it is consciousness. It is not a gray zone.

"Being able to report, or acknowledge to oneself" is to me, the definition of consciousness. It doesn't involve memory, it doesn't involve fully articulated language, it might involve feeling (yet to which extend, I am not sure) but it extirpates what consciousness is.

Inge Broer  31 July 2012 18:44
During the talk, I actually wondered about the importance of memory and expression.

You say: "Even if the content of consciousness isn't properly articulated during this period and memory of it can be brittle, it seems to me as it is conscious."

In a situation where the person feels, but is not able to report, and doesn't remember having felt when he/she IS able to report, how can we ever know it was a conscious experience?

In a way memory is a way to report to yourself what has happened to you in the past, and it is also required to report to others. So are they required to measure consciousness if not to actually be conscious?

Izabo Deschenes  30 July 2012 10:30
I was wondering the same thing about locked in syndrome! where would that fit in? As well, on the other end of the spectrum, couldn't there be things that are not conscious but are 'able to respond to external commands', such as robots?

It is also very interesting to examine the link between memory and consciousness (as Carey mentioned HM). It seems long-term memory is not necessary for consciousness. (I don't think anyone is claiming that HM was unconscious) If memory is not necessary, would one need the sense or recognition of the self to be conscious? Does a cat know it is a cat? Even if a cat didn't know it was a cat, it seems to me it would still 'feel' like something to be a cat. What is necessary to attribute consciousness to an organism other than to ourselves?

Amir Shmuel  Neurophysiological and hemodynamic measurements of spontaneous activity and functional connectivity

Abstract: Recent functional MRI (fMRI) studies in humans have demonstrated large amplitude slow (< 0.1 Hz) fluctuations in the resting state. Importantly, these spontaneous fluctuations in the Blood-Oxygenation-Level-Dependent (BOLD) signal are often synchronized over distant parts of the brain, a phenomenon termed resting-state functional connectivity. Functional connectivity analysis identifies resting-state networks of areas that also coactivate in response to stimuli or tasks. In my talk, I'll first explore whether fMRI-measured spontaneous fluctuations reflect those seen in neurophysiological activity. I will then demonstrate that resting-state functional connectivity exists in a hierarchical manner in space. In addition to the commonly reported networks on the spatial scale of cortical areas, smaller networks can be observed at the resolution scales of sub-areas and cortical columns. I will conclude with hypotheses on the mechanisms involved, the role of spontaneous activity, and implications for clinical neuroscience.

Comments invited

Posted by Stevan Harnad

9 comments:

Shady Rahayel  9 July 2012 07:49
Yet again, this talk makes me think about how complex and somewhat incoherent the brain (and the underlying cognitive processes) are. When I see all the very detailed
Amir Raz: Hypnosis as Experimental Tool to Study Metacognition, Causality and Volition

Abstract: An early form of psychotherapy, hypnosis has been tarnished by a checkered history: stage shows, movies and cartoons that

sub-analyses that A. Shmuel does in his participants, I'm really understanding how far away we are from having resolved the easy problem of consciousness. Even though we anticipate the easy problem to be solved at some point in time, it's indeed very audacious from us to dare trying to understand the feeling emerging from the doing.

We might be "more or less enthusiastic" about discoveries on the neural bases of consciousness, thinking that it'll never explain anything about the feeling of our behaviours. However, we're maybe at the very early beginnings of our researches, just like were the theories prior to the discovery of Higgs' bosons. They just succeeded in linking something that was thought to be linked, without ever being sure it could actually be linked, maybe we're on the same path?

Amir Shmuel 16 July 2012 15:35
I agree with the general notion that I believe comes up from this comment, namely that finding the neuronal mechanisms underlying consciousness is probably one of the hardest questions to address at this point, and also probably a question which is not well defined compared to other existing questions.

Carey YL Huh 9 July 2012 19:19
I realize I asked a stupid-sounding question at the discussion (it may indeed BE a stupid question). But what I still don't get is, if Dr. Shmuel showed that the spontaneous fluctuations in the metabolic MRI/PET signal are correlated with a neural signal such as the LFP (local field potential), and other studies have shown correlation between the metabolic signal and breathing, how much of the spontaneous fluctuations reflect breathing-induced artifact and how much is induced by neural activity? Also this may be naive of me to ask, but is the breathing correlation really an artifact, or are neural signals also affected by breathing (at least at the .01 - .1Hz range as discussed by Dr. Shmuel)? It would have been informative to see fourier analysis of the LFP signal in this low-frequency range.

Amir Shmuel 16 July 2012 15:44
This is not a stupid question at all. The following is a reference that quantifies the amount of variance in human resting-state activity that can be explained by breathing artifacts, and the amount of variance that can be explained by neurophysiological activity:

Based on other studies of hypercapnia and neurophysiology, I expect that the variation in breathing rate are not large enough to change neurophysiological activity, so these are two (neurophysiological activity and breathing rate) independent variables that influence MRI-based resting state activity.

Pauline Claude 16 July 2012 04:07
(I know I already asked Amir this question during the question session but I think this is worth being on the blog)

First, I was wondering whether studies on default mode network had been done so far? and secondly, I was wondering to which extent the presence of a decreasing activity of the default mode network was thought to be related to consciousness? that being said, I was wondering, if some some species don’t have this decreasing activity in the default mode network, whether the default mode mode network might be use as a criterion to distinguish the species having consciousness or not?

Amir Shmuel 16 July 2012 15:55
On: 'whether studies on default mode network had been done so far': just google it, you'll find plenty.

On: 'to which extent the presence of a decreasing activity of the default mode network was thought to be related to consciousness': the following paper is the one that gets closer than any other paper I know to relating activity in the default mode network to consciousness:


On: 'if some some species don’t have this decreasing activity in the default mode network, whether the default mode mode network might be use as a criterion to distinguish the species having consciousness or not?': well, if we believe that the default mode network does underlie consciousness, than your suggestion makes sense.

Nico Sheppard-Jones 18 July 2012 10:19
Thank you for the reference Dr. Shmuel, I was also wondering about potential involvement of the default mode network (DMN) in modulation of conscious awareness. A few of the talks during the Institute, and most recently, Dr. Plourde’s, hinted at a role for the thalamus in modulation of conscious awareness. The DMN is made up of only cortical brain structures, namely the Anterior cingulate, Posterior cingulate, Medial Prefrontal and Inferior parietal cortices. It would make a stronger case both for involvement of the DMN and of the thalamus in modulation of conscious awareness if one could show coordinated activity between the two. Clinical reports may provide key insights into the coupling of these different brain regions. Mild Traumatic Brain Injury has been shown to cause disruption of activity in the MPFC (a key DMN region), and I also came across an article that showed that resting state thalamic activity was reduced in mTBI patients. This I thought was interesting because selection criteria for study participants were posttraumatic amnesia and/OR loss of consciousness. http://radiology.rsna.org/content/260/3/831.long

These kinds of associations/questions can help further our understanding of consciousness, both ‘normal’ and impaired.

Amir Raz 31 July 2012 12:05
Still waiting for today’s iteration of W. James quoting! QT @syka_tts: W. James, the Most Cited Author of the summer school?
REPLYING TO: Simon @syka_tts
W. James, the Most Cited Author of the summer school?
perpetuate specious myths; and individuals who unabashedly write 'hypnotist' on their business cards. Hypnosis is in the twilight zone alongside a few other mind-body exemplars. Although scientists are still unraveling how hypnosis works, little is mystical about this powerful top-down process, which is an important tool in the armamentarium of the cognitive scientist seeking to unlock topical conundrums. Philosophical research has revealed a great deal about three categories of behavior: conscious decision-making, authorship, and sense of control. However, little conclusive evidence regarding their interdependent nature has been found, due to the difficulties in separating their influences on tasks such as decision-making.


Comments invited

Posted by Stevan Harnad

34 comments:

Pierre Boucher 9 July 2012 15:15
So the way I formally understood hypnosis is that it is suggestion. And that the more suggestive you are the more hypnotizable you will be. I learned a lot about hypnosis today and that it is a concentrated state of awareness. It sounds a lot like another psychological phenomenon known as "flow". Where experts or people working on a project will get into a trance like state where they do their work with incredible concentration and automaticity. Is this similar to hypnosis or a suggestive state?

As well during the talks I thought about the fact that when we have a conference like this we usually take for granted the fact that the speakers know what they are talking about. Although we may have never met the person before or see them do their work we believe what they are saying due to our own notions and what other people say about that person. This may again have something to do with being suggestible.

Thierry Laurion 30 July 2012 16:42
I would add, still I'm really novice in that subject, that hypnosis is mostly based on subject expectations. At the moment an expectation is there, easier is the suggestion since the person is already expecting something to happen. "What the mind expect tends to realize".

This partly explain why we tend to trust people who have a certain authority in a domain. We expect them to say the truth.

Stevan Harnad 10 July 2012 03:52

HYPNOSIS AS A MODEL FOR THE OTHER-MINDS PROBLEM

Are hypnotic subjects really feeling what they act as if they are feeling?

Also, even if hypnosis has something to do with concentrated attention, and even if it is always a result of self-hypnosis, it seems to be very closely related to the power of language, which is not just a means of mind-reading and mind-writing (non-paranormal "telepathy"), but a form of mind-altering (non-paranormal "telekinesis").

Laurence Dumont 26 July 2012 17:53
I think that the point you are bringing forward highlights the link between feeling and agency. In the case of hypnosis it seems like, along with compliance, there is reduced agency following suggestions made during hypnosis. Then, the question "do the subjects really feel what they act?" seems to appeal to agency to me here.

Does it feels the same when we are under hypnosis? I can not tell yet because I have never been hypnotized, but I think that if agency and concentrated attention are really key in hypnosis, we could "isolate" what the feeling of agency and the feeling of concentrated attention brings into action.

Laurie-Anne Dion 9 August 2012 07:11
You made a good point. I also felt like hypnosis and the feeling of agency where closely linked. When someone is under hypnosis, isn't the person just acting without the feeling of agency? So, when the person is under hypnosis, the lost of agency surely affects the subjectivity, thus the phenomenal consciousness.

And for Stevan's question, if the person acts like he's feeling something, and we want to know if he's really feeling it, I guess the only thing we can trust is psychophysiological datas. If hypnosis can alter perception and (to a certain extent) consciousness at a behavioural and brain activity level, I don't know how we could say that they are not feeling what they act as they are feeling. The only thing they don't seem to feel is the feeling of agency.

Stevan Harnad 9 August 2012 07:34

FEELING VS FEIGNING

I agree that with hypnosis, all we have is behavioral and physiological correlates to go by, and they're probably good enough. (That's all we have to go by with feeling in general, too.)

The hard problem is explaining how/why organisms really feel, rather than just doing whatever they need to do.
HOW FEELINGS MATTER

If you suggest to a subject that you will pinch him and he will not feel it, what matters is whether the subject does or does not feel it, not whether the subject says and acts according to what you suggest. This is a fundamental question about how feelings matter. Surely it does, otherwise we won’t have this empathic ability? Of what your feeling might be and not according to your real feeling. But does this feeling that the other might feel really matter? It’s quite obvious that an individual acts according to his/her own feeling but what about individual interacting with him/her? They interact with you according to their feeling what really matters is the feeling (of the subject) or the feeling (of the observer) that only feeling matter. Much for an observer if it doesn’t really matter for the subject? That’s why I keep questioning the relevance of saying “only feelings matter” and keep wondering whether threat that would not be felt because the individual is highly concentrated on something else) from an individual’s point of view (eg. a hypnotized individual) would matter so much for an observer. I made a rapid search and have found reviews about the influence of cognitive hypnotherapy on bulimia, pain management (e.g., cancer, fibromyalgia syndrome, irritable bowel syndrome, sickle-cell disease), anxiety disorders, sexual problems, pediatric headaches, etc. However, as A. Raz said, many of those studies are a bit crappy because of their methodology. Without having read these reviews, I tend to think that hypnotherapy is an interesting kind of therapy for those with an appropriate level of hypnotizability.

I’m really interested in what would be the neurological basis of a low or high level of hypnotizability in an individual.

Hypnosis can thus lead to reduced interference between systems. Interesting study.

If hypnosis can be thought of as a very concentrated form of attention, is there an evidence that it can enhance learning? I ask because attention has long been known to enhance some forms of learning. If so, can something that is learned during hypnosis persist in the subject’s brain afterwards? It will be interesting to do MEG/EEG recordings during hypnosis and compare it with some of the neural correlates of attention (e.g., decreased alpha and increased gamma synchrony).
as if he does not feel it, nor whether the hypnotist or anyone else feels that the subject does not feel it.

This is what makes it all the harder to explain how and why organisms feel: Evolution, the Blind Watchmaker, is no more of a mind-reader than any of us (including hypnotists). So there is no way for evolutionary selection to be based on whether or not an organism feels: only on what an organisms does.

(About empathy and mattering, I think you keep missing the point, Pauline. What matters is pain. Without exception pain matters to the feeler of the pain. Whether it matters to the causer or witness of the pain depends on whether the causer or witness is empathic or sociopathic. But the Blind Watchmaker can only design organisms on the basis of doing, not feeling, whether the doing in question involves empathy/indifference to the injured doings of others or fondness/indifference to the presence of foods high in glucose: Yes, we eat candies because they taste good; and yes we help those in need because we feel sorry for them (and not just if they are our progeny). But you have to distinguish what matters to us, feelingly, from what matters to the Blind Watchmaker, functionally.)

Klara Kovarski  22 July 2012 11:56

This subject's talk about hypnosis was very interesting and original. I have two questions about it. Is someone under hypnosis the real agent of his own actions (in a moral context for example)? If I am right it could be impossible to distinguish a normal person from someone hypnotized just by his behavior. I was wondering if there is an another way to understand the real state of someone (like by neuroimaging).

Félix Mongeon  24 July 2012 09:19

I think that being manipulated by someone when doing a crime can be an attenuating circumstance in criminal law. I think that was the case of Karla Homolka: she has been manipulated by her boyfriend, who was psychopath, and here sentence was reduced because of that. I see this as an example of the justice considering that agency has been reduced as a result of manipulation (i.e. suggestion, hypnosis or whatever we would call it, as long as it involves some sort of manipulation).

I am not convinced about your claim that it could be impossible to distinguish between a normal and a hypnotized person just by its behavior. In fact, observers can be trained to recognize subtle behaviors.

Apart from distinguishing a hypnotized person "just by its behavior", you can for sure distinguish him based on other indices. Notably, the phenomenology of being hypnotized is quite different from normal experiencing in that your feeling of agency is lowered when hypnotized. Moreover, you can identify the hypnotizer's manipulations and the corollary behaviors of the hypnotized person.

Shady Rahayel  25 July 2012 08:13

If there are other ways of identifying the "real state of someone"? We would see it through EEG if one person is behaving under wavelengths that aren't regular to his behaviors. Hypnosis changes the pattern of neural discharge in the brain, and this synchronicity could be investigated through EEG.

Someone under hypnosis does not lose the contact with the reality that surrounds him. He would not commit any criminal acts if he does not have such a personality in real life. My hypothesis is that he is just commits a criminal act under hypnosis (like a murder), the circumstances would have been there as well in real life for the murder to be committed by the person (an antisocial personality, revenge towards the person in question, appropriate circumstances, and so forth).

I think that hypnosis has often been used in court to justify some particular and horrendous crimes, and it's been dismissed quite rapidly considering how hypnosis shouldn't be awaiting specific "brutal drives" in an individual, if these weren't present in the past.

Thierry Laurion  30 July 2012 17:16

In fact, fro what I know (correct me if I'm wrong) but hypnosis cannot induce you an idea that doesn't echo something you want to. The wording, language used, is as important as the suggestion. In fact, the moment you are not "in phase" with a suggestion, that you doubt about the intentions of the hypnotherapist or you are confronted with images that you don't feel confortable with, you will lose the level of trance that you were brought too. Once again, I would repeat that "what the mind expects tends to realize"... Only if you want to.

Nico Sheppard-Jones  23 July 2012 10:53

I was wondering what - if any - parallels Dr. Raz might think exist between dreaming and hypnosis. Hypnotized individuals can certainly feel - if we define consciousness as feeling, then I think all would agree that they are conscious. I think we also 'feel' when dreaming. Certainly, nightmares (although a very speficic class of dreams) induce strong emotions, and I think most would agree that an emotion is a kind of feeling. What seems to be absent in both these states is a form of volition. During hypnosis, the subject's volition is either absent, or dominated by the hypnotist's suggestion. In dreaming, the absence of volition is more subtle I think. However, reports of 'lucid dreaming' - that is, when a person can take control, so to speak, of their dream - would suggest that in 'normal' dreaming, volition - or the impression of volition - is quasi-absent. What does this tell us about the role of volition? What part does volition - or the impression of volition - does play in consciousness? Does equating consciousness to feeling make for too broad a definition?

Shady Rahayel  25 July 2012 08:05

I think that there are several other differences between a hypnotic state and sleep. Sleep is characterized by several phases, several of which induce dreaming. There can be dreams in slow-wave sleep, although these are less rich than those we can find during rapid eye movement sleep. These extended boundaries in sleep/dreaming are different from a hypnotic state, as I consider it less rich than dreaming (broadly speaking, with less nuances in its state).

Moreover, hypnosis is almost entirely based on external stimuli: a hypnotic state takes its richness from the suggestions coming from the hypnotist, whereas dreaming is almost entirely based on internal stimuli.

There also seems to be a strong implication of the dorsolateral prefrontal cortex in hypnosis (in order to be capable to direct its attention to where the hypnotist wants it to be directed to). The dlpf cortex is not activated in dreaming, which probably is the reason why dreams are often illogc, accompanied by disorientation, etc.

I think this is why hypnosis is so interesting, as well as dreaming: these are conscious states, states from which we are conscious in retrospect, and they nuanced the global understanding of consciousness.

Roberto Gulli  26 July 2012 19:08

That's a really interesting line of thought Nico, and one that was not explored during the conference in these terms. Searle defined 4 properties of consciousness as he understands it, one of which is intentionality. In your scenario, do you take intentionality and volition to be analogous? If so, the following conflict arises: since intentionality in these cases is absent, one who follows Searle's description of consciousness would say the individuals in the scenarios you describe are not conscious. One in Harnad's camp would say these scenarios certainly do describe feeling (followed by a reminder about weasel words), and thus these scenarios do describe conscious states. One of these two positions must be wrong, but which one depends on how you define consciousness/feeling. This ambiguity and lack of consensus has been, for me, the frustration of these many talks.
Searle's intentionality is not voluntary movement but aboutness as in "that was not my intended meaning."

Matthew Leavitt  27 July 2012 09:29
Given that individuals under hypnosis can "forget" the number 4, not feel pain, or (possibly) generate pain responses in the absence of noxious stimuli (the hot coin), is it possible to convince someone that they're not alive? Clearly there are ethical issues with this, but I'm curious what the physical limits are.

Inge Broer  31 July 2012 17:55
Oh what an interesting question! My guess would be that given that people will respond only to suggestions they are not averse to, they might not really want to comply to this suggestion. But what would happen if the person is severely suicidal? Definitely not something to try out.

What I find so very interesting about all these studies and results is that it allows the hypnotized person to temporarily experience reality in a very different way. I think it tells a lot about how we represent reality and has has the potential to tell us a lot about how we construct that reality in the first place...

Thierry Laurion  30 July 2012 16:44
Has someone found the article/video showing facts that we missed int eh conference about the pain response in the absence of noxious stimuli (the hot coin)?

Jennifer Robinson  31 July 2012 11:33
(In response to Thierry)
I found this interesting article.
http://siivola.org/monte/papers_grouped/copyrighted/MiscHerpes_Simplex_and_Second_Degree_Burn_Induced_Under_Hypnosis.htm

Izabo Deschenes  1 August 2012 00:16
I was also wondering about this, thanks for the reference!

Xavier Déry  31 July 2012 12:07
Raz, is it "really" surprising that humans don't have the urge to understand the techniques they are using, as long as they work? Raz takes a detour to point out how ridiculous trying to score better on a IQ test is, trying really to fool yourself! Indeed.

Eric Muszynski  5 August 2012 08:30
Dr. Raz mentioned that there are certain things that hypnosis cannot do, such as grow back an arm, or teach a foreign language. I wonder what the limits truly are? If burns or (as the article linked above claims) herpes can be induced, then significant physiological changes are not out of the question. How far can we go in pushing the mind to affect the body?

Thierry Laurion  5 August 2012 12:46
I came across this video. Effects of the "mind" on the body. You should all have a look.
http://www.youtube.com/watch?v=0nF_gAZTOv8

**John Searle: Consciousness and Causality**

**Abstract:** How do neurobiological processes in the brain cause consciousness? I think this is the most important question in the biological sciences today. Two related questions: Where exactly is consciousness realized in the brain and how does it function causally in our behavior? We know consciousness happens and we know the brain does it. How does it work? How do we approach this problem scientifically? The standard way is to go through three steps. First, try to find the neurobiological correlate of consciousness. Second, try to test if the correlations are in fact causal. Do the neurobiological states cause consciousness? Third, try to formulate a theory. Why do these processes cause consciousness at all, and why do these specific processes cause these specific conscious states? One depressing feature of this entire research project is that it does not seem to be making much progress.

Mystery of consciousness. a book by me. NYRB book
http://files.meetup.com/227880/The%20Mystery%20of%20Consciousness.doc
The Problem of Consciousness:
http://users.ecs.soton.ac.uk/harnad/Papers/Py104/searle.prob.html
How to study consciousness scientifically
Free Will as a Problem in Neurobiology
http://philantries.free.fr/Searle_Free_Will_as_a_Problem_in_Neurobiology.pdf
DOING, FEELING, EXPLAINING AND DURESS

(i) Language is both doing and feeling (just as most things we do while awake are); T2 capacity to respond appropriately to verbal input/output is doing. Understanding and meaning is, in addition to doing, feeling. But, until further notice, the function that language performs (the functional advantage it confers) is just doing, like all evolutionary advantages: It is what helps survival and reproduction. Like us, the "Blind-Watchmaker" is no mind-reader.

(ii) Sensorimotor symbol-grounding is also doing; the fact that it is also felt is unexplained.

(iii) If we could discover (and explain) any function requiring (let alone "absolutely requiring) feeling, we would have solved the hard problem.

(iv) Passing the Turing test only generates doing; if it also generates feeling, we cannot explain how or why. (When Searle is manipulating meaningless Chinese symbols according to formal rules, and feels that he does not understand Chinese, he is indeed not understanding Chinese [do you doubt that?]; he is at best just "doing" Chinese.)

(v) If any of the many waking functions that are felt functions "requires" feeling, then no one has yet given a hint of how or why. (Ockham may "say" that therefore we can forget about feeling, because everything can be done without it, and hence it is functionally and explanatorily superfluous, but that does not solve the hard problem, it merely re-states it. And although we should make sure to focus on the epistemic problem of explaining feeling -- rather than the ontic problem of puzzling about whether there exists one kind of "stuff" in the world, or two -- everyone knows that maintaining an embarrassed silence about feeling does not make feeling disappear from the world, nor explain it!

If only language requires "feeling", why would organisms without language need a "feeling" function? Ockham says no.

Pierre Vadnais: Language a *feeling* or a *doing* function?

Stevan Harnad: Pierre Vadnais, which of the many functions has *feeling*? Can we identify any other function absolutely requiring "feeling"?

Pierre Vadnais: I cannot say that "Passing the Turing test only generates doing" until you have passed the Turing test. My point is precisely that if TT was only doing, engineers would have solved the problem.

For the Chinese Room, Searle assumes 1) that the program in the book can pass the Turing test and 2) that "Passing the Turing test only generates doing", but he doesn't know what is required for 1) to be true. If 1 includes a "feeling" function (agreed we have no clue about that "feeling" function, but we have no clue about its non-requirement either), maybe after integrating the program he would feel differently.

I don't doubt what he thinks he would feel after learning the program, I simply know that he cannot have a clue about how he would feel after learning a program that he cannot write, a program that nobody in the world has been able to imagine after decades of research with a $1,000,000 reward.

I have no ontic problem, no puzzling about substance dualism, nor about property dualism. I am with Searle all the way about causality and reality. I don't want to hide "feeling", on the contrary I don't think we can make real progress in Artificial Intelligence if we don't understand it. Luckily, it's strictly causal.

Stevan Harnad: Good luck with hoping that the Turing-Test-passing model will somehow explain feeling -- but remember that the TT-passer will not just have to have verbal capacity (T2) but robotic capacity (T3), hence the model will not be just computation.

And even if it had been just computation, try testing whether having a subject memorize the computer program for playing and winning binary-decimal tic-tac-toe gives that player an understanding that he is in reality playing tic-tac-toe. (Substitute for every "move" in tic-tac-toe matrix abc-def-ghi the decimal number for the binary number for each row -- 001-000-100 becomes 1-0-4 and the winning move is then 1-2-4.) If the player does not thereby understand that he is playing tic-tac-toe, even though he is playing (doing) tic-tac-toe, Searle would not be understanding Chinese, even though he was doing it. No need to create the T2-passing program to see that. Searle's thought-experiment is enough.

Pierre Vadnais: Robotic capacities are just "doing" (e.g. Google's driverless car). True verbal capacity (i.e. penpal for 30 years) is NOT just "doing". So, T3 is not sufficient to pass T2. T4 is full brain "doing" including "feeling" and is required to pass T2.

T4 is robotic "doing" realized through a "feeling" brain. While T3 is a sensorimotor brain, T4 is a conscious brain. A strictly sensorimotor brain cannot be your penpal for 30 years.

There are many ways to play tic-tac-toe from a sensorimotor point of view. Number of ways are much more limited to play consciously. Not limited to biological ways, but certainly limited to neuronal ways.

Neuronal doesn't mean not computational. "Consciousness is causal, physically causal" Searle dixit. "Physical causality is computable" Turing dixit.
Stevan Harnad  9 July 2012 12:01
REPLY TO Pierre Vadnais

T2 is the capacity to speak and reply indistinguishably from a person. Speaking and replying is just doing.

T3 includes T2. Both are just doing. So is T4 (brain doing).

You miss the point about tic-tac-toe. You can do it without understanding (feeling) that you are playing tic-tac-toe, just as Searle would be "doing" Chinese speaking and replying without understanding Chinese.

Neural secretion (for example) is not computation. If something is computable it does not mean it is computation. Planetary positions are computable: orbiting is not computation.

Louis Chartrand  9 July 2012 12:34
I asked the question, and the answer was off enough that I didn't see how to get the conversation back on track.

There are models of intentionality and representation (and therefore description) that are observer-independent. Cf. Ruth Millikan's intentionality and pushme-pullyou representations, Andy Clark's Action-Oriented representation, similar models by Wheeler and others, Richard Menary's intentionality, etc.

Now, these models a) explain (or provide a framework to) how intentionality is realized and b) do it without intentionality. So basically they're superior, aren't they?

Saying descriptions of these models are observer-dependent, and therefore demand a sort of intentionality that demands consciousness is wrong, because to these models, intentionality and descriptions do not demand consciousness.

Félix Mongeon  17 July 2012 11:29
I think that observer-dependent objects are those objects which properties directly depend on their use by humans (and thus on how humans understand those objects). For instance, money would not exist (and would only be paper) without humans attributing exchange value to it and culturally agreeing about this value.

Similarly, if you define intentionality as both the doing and feeling aspects of top-down actions, the doing part would be observer-independent whereas the feeling part would be observer-dependent. In fact, you do not need to have a human or other system understand what it means and what it feels like to be a system exerting top-down control in order for this system to effectively exert this top-down control. In other words, it is possible to explain how a system displays top-down behaviors without having to refer to its understanding and feeling of such behaviors.

Pierre Vadnais  17 July 2012 12:40
What do you mean exactly by "top" and "down" in "a system display[ing] top-down behaviors without having to refer to its understanding and feeling of such behaviors"?

To me, sensorimotor behaviors without understanding and feeling is pretty much "down-down", isn't it?

Stevan Harnad  9 July 2012 13:09
OBSERVING IS JUST DOING -- EXCEPT IF IT'S FELT

1. Descartes was right: You can be wrong about whether this is warmer or cooler than that, but you can't be wrong that this "feels" warmer (or cooler) than that -- or, more fundamentally still, you can't be wrong "that" you are feeling whatever you are feeling, when you are feeling.

2. When I deliberately raise my hand, it feels like "I" caused it; but what actually caused my hand to rise is not evident. And if it's whatever caused the motor potential (or the acetylcholine secretion) it's not evident how or why that's "me" -- let alone why it's felt.

3. Observer-dependence is not what's hard, feeling is. There is observer-dependence in the viewpoint of a robot, but that's trivial if the robot doesn't feel. And if it feels, it's back to the hard problem: how and why does it feel.

4. The neural correlate of duck/rabbit perception is just a neural correlate of feeling, not a causal explanation. NCCs don't explain a thing; they just predict. And finding the light-switch is "not" a causal explanation.

5. Feeling is a biological trait, no doubt. The brain causes feeling, no doubt. But how and why? A light-switch won't explain it. It explains light. Feeling's not light. Light is something that electromagnetic frequencies do. Feeling is not doing. And physiological, biological, neural and engineering explanations are explanations of doings in terms of doings. (What seeing light feels-like to a feeler is another matter, but that sure isn't explained by the light-switch, internal or internal, nor by electromagnetic oscillations.)

Félix Mongeon  17 July 2012 11:37
Concerning the cause of John Searle's "raising my hand example" (point 2.), I think that he simply meant that even though we can identify the physical causes of actions, it does not refute the fact that all actions are caused by the self. This conclusion is based on a definition of the self as an entity that comprises both subjective and objective epistemology (to use John Searle's jargon), i.e. perceptions of the experience vs. perceptions of the physical world and agreed factual conventions, respectively.

Stevan Harnad  4 August 2012 18:23
Could't follow. Could you say it again more simply?

Arnold Trehub  9 July 2012 14:26
Stevan: "NCCs don't explain a thing; they just predict. And finding the light-switch is "not" a causal explanation."

I agree that NCC do not explain consciousness. But biological mechanisms "can" explain conscious content/feelings within scientific norms. Science can do no more than propose theoretical models/mechanisms that predict or post-dict relevant empirical findings. Science is not omniscient and cannot explain the "sheer existence" of any phenomenon. However, using the working definition of consciousness as a transparent brain representation of the world from a privileged egocentric perspective, a system of neuronal brain mechanisms (called the retinoid model) has been proposed that can realize this kind of brain representation. The logical implications of its neuronal structure and dynamics have successfully predicted/post-dicted many previously puzzling conscious experiences. For example see here:

http://people.umass.edu/trehub/YCCOG828%20copy.pdf

and here:

http://theassc.org/documents/where_am_i_redux
Why shouldn't we accept the retinoid model as a candidate biological explanation of conscious content/feelings?

Stevan Harnad  10 July 2012 04:28
TAKING FEELING FOR GRANTED

Because even if the "retinoid model" were to successfully explain brain function, and a mechanism based on it could successfully pass T3 or T4, it still wouldn't give a hint of a hint as to why any of it is felt, rather than just done.

Feeling is there in the world, no doubt. And surely it's the brain that generates it. But explaining how and why the brain generates feeling rather than just doing is the hard problem, the "doing/feeling problem," and one cannot explain it away by saying feeling's just "there," as a property of the world, like gravitation or electromagnetism. Feeling is not one of the fundamental forces. It calls for an explanation.

And explanation is not just correlational prediction.

But Arnold, please let's not re-enact our prior discussions in this Forum. It is sufficient to point the interested reader to the PhilPapers thread on the "Explanatory Gap."

Arnold Trehub  10 July 2012 07:03

Stevan, I don't want to re-enact our prior discussions, but I think the problem is important enough to extend our prior discussions.

You say "And explanation is not just correlational prediction." I whole-heartedly agree. But exposing the details of a "biological mechanism" that can be demonstrated to generate a conscious experience IS an explanation.

In my seeing-more-then-is-there (SMTT) experiment, I was able to demonstrate that the neuronal structure and dynamics of the brain's putative "retinoid mechanism" successfully predicted that subjects would have a vivid conscious experience/feeling of a triangle oscillating in space when, in fact, there was no such object in their visual field. Moreover, the properties of the putative retinoid mechanism enabled the experimenter to independently control the height of the subject's phenomenal/felt triangle while the subject was able to control the width of the phenomenal triangle to actually maintain approximate height-width equality. It seems to me that this SMTT experiment is analogous to the double-slit experiment in physics that demonstrated that light has the complementary properties of particle and wave, because it demonstrates that conscious content/feeling has the complementary properties of a particular kind of brain activity (3d-person perspective) and phenomenal experience/feelings (1st-person perspective).

Given this experimental demonstration that shows how a biological mechanism can generate a conscious experience, why shouldn't we consider the retinoid model to be a biological explanation of consciousness within scientific norms?

Stevan Harnad  11 July 2012 12:09

Neural firing frequency is correlated with and hence predicts perceived stimulus intensity. That doesn't explain how or why intensity is felt. (But it does explain how we "do" things that are a function of stimulus intensity.) Your retinoid prediction/correlation, Arnold, is just a more elaborate example of exactly the same thing.

Another way to put it is "Given" that we feel, the neural mechanisms can predict what we will feel; but they don't explain how or why we feel. They just beg the question.

Arnold Trehub  11 July 2012 19:05

Stevan, I should add this:

If you are a monist who asserts

a. Physical processes (physical doings) are all that exist.

and also asserts

b. Physical processes/doings can not be be feelings.

Then your assertions are either incoherent or what you call "feelings" do not exist.
If we reject materialism and dualism because both conceptions are grounded on a misleading vocabulary (namely the distinction between "mind" and "body"), could we say that the biological naturalism is a third kind of metaphysical hypothesis where only objects of experience are valid entities?

If this point is correct, what is the place of consciousness amongst these entities? Isn't it the blindspot that cannot observe itself?

Alexandre Duval 10 July 2012 09:33
When Searle discussed protons, electrons, dark matter and dark energy, it seemed pretty clear to me that he meant to imply that all of these things are genuine entities, just as much as objects of experience are. (Well, provided that our mature scientific theories still posit the existence of entities of this kind.) That was the point of rejecting the distinction between "mind" and "body." What you're describing as 'biological naturalism' is in fact very different from what is usually called 'naturalism.' It would be more adequately described as 'idealism,' which is a view that Searle also rejects.

Arnold Trehub 10 July 2012 09:56
I agree with Searle's view of consciousness. In particular, I was pleased with his emphasis on what he called the "conscious field" as a "prerequisite" for perception and all of the other enriching content of phenomenal experience. I have proposed a theoretical model of "retinoid space" which I think fits the requirement of a pre-existing conscious field. If John Searle is willing to engage in this discussion, I would be very much interested in his views about my argument with Stevan Harnad (see above). An overview of the retinoid theory of consciousness/subjectivity can be had here:
http://evans-experientialism.freewebspace.com/trehub01.htm

Pierre Vadnais 10 July 2012 21:04
Vincent LeBlankaert posted to Stevan Harnad

Could someone explain to me why there is no information in nature that is observer independent.
Could DNA code for different proteins than those it codes for?

Vincent LeBlankaert added
I think Searle thought my comment was irrelevant, so I see two options:
1. I can't figure out what he means
2. I'm naive as to what is the goal of scientists :)

Pierre Vadnais replied
Well, it depends what you mean by information :)
Information is often defined as data well-formed, meaningful and true. Many will say that it cannot be "meaningful" except for an observer. Truth is even more complex.

Some accept that info might exist without a receiver, but not without a conscious emitter.

If you stretch the definition, causality might be seen as a kind of information unconsciously emitted; it becomes meaningful only when interpreted by a conscious observer, but it exists before observation.

Does a tree falling in the forest make noise? Noise, yes; the sound wave is there. Information, not until somebody hears it. Searle said that the rainbow doesn’t exist; the light rays have certainly been relatively sorted, but you need a head to call it a rainbow.

Well-formed data is user-independent and it is true as long as it has not been interpreted. However, it not meaningful, therefore not information, until it is semantically interpreted by a conscious observer.

Stevan Harnad replied

FELT VS UNFELT OBSERVATION
It all depends on whether you mean felt or unfelt observation, and on what you mean by information.

Depends what you mean by "information" and on whether you mean felt observation or unfelt observation.

Let's say information is data (e.g., digitized as strings of 0's and 1's) the way Shannon & Weaver defined it.

There are plenty of observer-independent data in nature, both unfeeling-observer-independent and feeling-observer-independent. It's just that except when they are feeling-observer-dependent, the data don't mean anything. They are merely uninterpreted data, meaningless 0's and 1's (though some data do have the remarkable property of being systematically "interpretable," by and to feeling observers).

There's nothing mysterious about this. Data are just squiggles and squoggles except when interpreted by feeling minds. If a T3 robot is nonfeeling, it is grounded but it has not meaning. Hence it can do anything and everything we can do with data, but the data have no meaning for the T3 robot. If the T3 robot feels, hence it is a "feeling observer," then the data do have not just sensorimotor grounding (in doing) but also meaning.

Calling this "observer-relative" or "observer-dependent" is needlessly fancy and confusing. As Searle agreed, the "geometric" angle of gaze if even a toy robot is observer-dependent, then the data do have not just sensorimotor grounding (in doing) but also meaning.

Pierre Vadnais 10 July 2012 21:41

For Floridi, unfelt observation means missing the information. This is getting only the signal, but not the message. If you look at an MP3 file with an hexadecimal editor, you can see the binary code (or its hexadecimal equivalent), but you don't hear the music. That's unfelt observation. The music is all there, if you send the same file to an MP3 reader, you hear the music. The miracle of decoding, suddenly the symbols have meaning.

That meaning is only the first level. If you like music, you might recognize the tune, a level of meaning not accessible to someone who has never heard the piece. If there is a song over that music, you might recognize words, yet another level of meaning not readily available to people speaking a different language and certainly not available to any non-human animal.

Shannon's "Mathematical Theory of Communication" clearly requires conscious emitter and receiver. It's all about encoding and decoding.

There is something called environmental information. Something like the rings on a cut tree stump. It is available for anything with eyes to see animals, T3 robots, whatever... Only humans can discover that these rings could be related to the age of the tree. Humans can program T3 robots to detect the rings and calculate the age, but T3 robots would never on their own have discovered that trick... that requires consciousness.
This environmental information had no conscious emitter. It doesn't really get meaning until some conscious observer receives it. For most philosophers, no meaning implies not information. Still it is there, seen or not, ever before the tree is cut... as much as any molecule, mountain or tectonic plate (as Searle would say)... and as much as the noise of the tree falling in the forest or the unattended rainbow.

Stevan Harnad 12 July 2012 11:29
INFORMATIONAL HERMENEUTICS

The usual way to try to ground knowing according to contemporary theory of knowledge is: We know something if (1) it's true, (2) we believe it, and (3) we believe it for the "right" reasons. Floridi proposes a better way. His grounding is based partly on probability theory, and partly on a question/answer network of verbal and behavioural interactions evolving in time. This is rather like modeling the data-exchange between a data-seeker who needs to know which button to press on a food-dispenser and a data-knower who already knows the correct number. The success criterion, hence the grounding, is whether the seeker's probability of lunch is indeed increasing (hence uncertainty is decreasing) as a result of the interaction. Floridi also suggests that his philosophy of information casts some light on the problem of consciousness. I'm not so sure.


Pierre Vadnais 13 July 2012 10:20

Thanks for the reference; read it before and was not very surprised by your conclusion: "Consciousness is feeling".

However, I find your summary of Floridi's proposal very interesting. What if the data-seeker (DS) and the data-knower (DK) were two parts of a same brain? (I guess this is what Floridi intends to do with his two-machine artificial agent - AM2). DK could be a standard sensorimotor neural network learning through experience and evolving under natural selection. At some point, a new network appears interconnecting symbols, a semantic network. The symbols become connected to their counterpart in the sensorimotor network; that's your idea of grounding. But the symbols also have to be interconnected between themselves; that's semantics, not only meaning of the words, but meaning of interacting words. The semantic network becomes a DS relative to the sensorimotor network since it is trying to reproduce between the words the rules that helped DK to get a better lunch. Better semantic rules then help DK to get a better lunch even more often and DK gets better at avoiding natural elimination.

Same message I have been trying to pass from the beginning, just hoping that using your metaphor (DS-DK) of Floridi's proposal will make the message clearer.

Pierre Vadnais 13 July 2012 10:21

THE ONTOLOGY OF WORDS.

Spoken words are of the same nature as rainbows or noise of falling trees except that they have a conscious emitter. They are short-lived and have no effect unless they fall in a conscious hear.

Written words are of the same nature as spoken words, they also have a conscious emitter. However, they enjoy a longer life. Think Egyptian hieroglyphs which remained undecipherable for centuries. Human knew that they meant something because their regularity could only be explained by a conscious emitter.

This line of reasoning is dangerous though, since it can also lead to the conclusion that regularities in nature require intelligent design. But we all know that the rings of cut tree stumps are the result of physical causality not conscious design. Therefore we all know that true well-formed data (potentially meaningful) exists without a conscious emitter and before conscious reception.

Stevan Harnad 13 July 2012 11:19

(1) Whether the information (data) transfer is occurring within one system, or between two systems, it is simply information transfer unless it is felt. And it is not the causal role of the information transfer (doing) that is at issue here, but the causal role of the fact that it is felt.

(2) Words are sounds, and hearing them feels like something, just like hearing any sound does (if audible, and heard). Words (or other data) can also mean something (if semantically interpretable); and both saying them with an intended meaning and understanding what they mean likewise feel like something.

Pierre Vadnais 13 July 2012 13:01

So, you really don't want to buy that consciousness (feelings if you prefer) lies in the intricacies of semantic interpretation... That would at least reduce the domain of research.

Stevan Harnad 13 July 2012 19:40

No, I really don't. The preceding sentence is semantically interpretable. In your head, if you understand it, it not only allows you to do what understanding it entails -- answer, infer, act (doings, all) -- but it also feels like something to be understanding it. If, in a T3 robot, the sentence only allows it to answer, infer, act, Turing indistinguishably, but not feeling a thing, then the sentence has (T3) grounding, but not meaning. (In Searle's terms, its semantics remain extrinsic rather than intrinsic.)

(Ceterum censeo: I happen to believe that a T3 robot would feel. But I cannot say why or how...)

Pierre Vadnais 14 July 2012 07:36

Sounds are audible and heard. Words are audible, heard and understood. Feeling is understanding that you understand: two levels of the same process.

Words have a composability that sounds don't have. Music is a composition of sounds, but it is not fully understood. It gets to the feeling level without full understanding. You feel something, but you cannot really decipher the message.

Arnold Trehub 14 July 2012 12:53

I have found this to be a useful way to think about information:

Information is any property of any object, event, or situation that can be detected, classified, measured, or described in any way.
1. The existence of information implies the existence of a complex physical system consisting of (a) a source with some kind of structured content (S), (b) a mechanism that systematically encodes the structure of S, (c) a channel that selectively directs the encoding of S, (d) a mechanism that selectively registers and decodes the encoding of S.

2. A distinction should be drawn between "latent" information and what might be called "kinetic" information. All structured physical objects contain latent information. This is as true for undetected distant galaxies as it is for the magnetic pattern on a hard disc or the ink marks on the page of a book. Without an effective encoder, channel, and decoder, latent information never becomes kinetic information. Kinetic information is important because it enables systematic responses with respect to the source (S) or to what S signifies. None of this implies consciousness.

3. A distinction should be drawn between kinetic information and "manifest" information. Manifest information is what is contained in our phenomenal experience. It is conceivable that some state-of-the-art photo-to-digital translation system could output equivalent kinetic information on reading English and Russian versions of War and Peace, but a Russian printing of the book provides me no manifest information about the story, while an English version of the book allows me to experience the story. The "explanatory gap" is in the causal connection between kinetic information and manifest information.

I should add that manifest information requires subjectivity; i.e., registration of kinetic information within an egocentric space.

Pierre Vadnais 13 July 2012 13:20

Google's car and consciousness

John Searle goes to a party and gets totally wasted. His host, a very rich man, happens to have Google's driverless car in his garage. John Searle sits in the passager seat, has just enough time to utter his home address, and pass out.

When he opens his eyes, because his wife is yelling "OPEN YOUR EYES!!" (probably at the recommendation of Dr Plourde), he has no recollection of how he got there.

Was the car conscious or not? Of course not, but Searle wasn't either.

If feelings were involved in this trip, they were probably felt by the programmers who built some meaning in the perceptions (sensors) of the car. This suggests that feeling is in the building of the semantic network, not in the using.

I know, I'm still missing the point...

Stevan Harnad 13 July 2012 19:33

Yes, you're missing the point. Feelings were not involved in this trip: doings were.

Maxwell J. Ramstead 15 July 2012 08:57

I am not convinced that Doctor Searle has successfully proven epiphenomenalism is wrong. Indeed, many talks during the summer school, such as Doctor Brembs' and Doctor Cisek's, seem to imply: A) that the actual decision to move, for instance, is completely determined by neuronal dynamics, and B) that the feeling of volition is constructed post facto. Accounts such as Doctor Graziano's further lend support to the idea that consciousness is the end product of cognitive representation—it could be involved in all action, yet still not be causally responsible for anything.

Perhaps one could say, as Doctor Searle has, that the feeling of volition and the behavior occur simultaneously, which yields my feeling of having been the source of my action. However, the actual dynamics of my action, at least it would seem, are such that the cause of both my behavior and my feeling of volition is an underlying neural decision mechanism, which depends on dynamical system features such as nonlinearity and criticality. Hence, despite my feeling like my mental state (the will to raise my arm) caused my physical state (my arm moving), there need not be any causal link between the two.

Furthermore, simply declaring that the mind-body problem is solved is not, IMHO, a very convincing way to deal with the problem. Doctor Searle adds that consciousness couldn't have no function—it has too many! Indeed, he points out that almost all my doing is accompanied by feeling, and I agree with this point of view. Consciousness indeed seems to play an essential part in all higher-order (and most lower-order) cognitive tasks.

While I find this intuition appealing, I believe it still does not imply that consciousness itself plays any causal role in decision-making. Consciousness could be part of all complex behavior, as Doctor Searle insists, yet still not be causing any of the behaviors Doctor Searle believes it is responsible for.

Stevan Harnad 22 July 2012 09:42

The hard problem is an explanatory (hence epistemic) one: What is the causal role of feeling?

Epiphenomenalism is just an metaphysical dogma, which does not answer the question but simply restates it as follows: Feeling has no causal role; it's just there.

Forget epiphenomenalism and take your pick between these two: (1) we haven't explained the causal role of feeling yet; or (2) the causal role of feeling cannot be explained (but then be prepared to explain why not).

Arnold Trehub 15 July 2012 09:17

Consciousness is your occurrent phenomenal world. Which of your volitional behaviors are not contingent on salient properties of your phenomenal world? I would argue that your phenomenal world (consciousness) *must* be a part of the causal chain in all of your non-reflexive behavior.

Maxwell J. Ramstead 15 July 2012 21:01

IMHO, just because all volitional action comes to be represented phenomenally, does not necessarily imply that all volitional behaviors are contingent upon salient features of my phenomenal world. Indeed, it seems to me that the actual deterministic factors that determine volitional action are themselves quite unconscious until they reach a given critical point and stabilize into a decision. And phenomenal behavior being part of the causal chain I agree with—I just think consciousness might be located at the end of that chain.
Attention probably has a lot to do with causal action-selection, but attention acts on both conscious and unconscious cognitive processes. As for consciousness, I'm not so sure.

**Arnold Trehub** 16 July 2012 09:27

"Indeed, it seems to me that the actual deterministic factors that determine volitional action are themselves quite unconscious..."

Yes, the decision to make a volition act is pre-conscious and seems to occur about 500 milliseconds before we are consciously aware of the decision. But the critical point is that the whole volitional episode STARTS IN RESPONSE TO SOME PARTICULAR ASPECT OF OUR PHENOMENAL WORLD. No phenomenal world, no volitional acts. No volitional acts, human-style adaptation is impossible. This explains why we feel. You might find it helpful to read "The Pragmatics of Cognition" on pp. 300-301 in "The Cognitive Brain" here:

http://people.umass.edu/trehub/thecognitivebrain/chapter16.pdf

Maxwell: "And fundamentally being part of the causal chain I agree with—I just think consciousness might be located at the end of that chain."

So do you actually believe that if you were not conscious you would be able to begin to respond to my comments here? If so, please explain how this could happen.

Maxwell: "Attention probably has a lot to do with causal action-selection, but attention acts on both conscious and unconscious cognitive processes. As for consciousness, I'm not so sure."

Almost all current discussion of attention is vague. If you think about the neuronal mechanisms of attention, I think you will find that what we call selective attention is a directed shift of neuronal activation in the phenomenal world around us. So selective attention is an integral part of our conscious experience. We are not conscious of other kinds of attentional processes such as priming and gating of our pre-conscious synaptic matrices. This is explained in detail in "The Cognitive Brain" (1991).

**Pauline Claude** 16 July 2012 02:20

**COMMENTS COPIED AND PASTED FROM FACEBOOK**

"Why consciousness? why life? why the universe?"

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**Pauline Claude** 16 July 2012 02:23

Stevan Hamad

"The universe is not a biological trait, hence no adaptive function. Life is a precondition for adaptive function (though it's possible that the self-replicative property of genes is at the root of adaptive function). But feeling (consciousness), like feeding and flying, is a biological trait. Hence it is natural to ask what is its adaptive function (i.e. "why?")."

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**Pauline Claude**

"Actually it was not "why" for the adaptive function but rather why it appeared first? Any biological traits that appears and is maintained by natural selection actually did not appear because it was adaptive. A trait appears first by mere chance, exactly as life probably did and exactly as the universe probably did. I agree they are maintained because they appeared to be adaptive but they surely didn't appear because they were adaptive. There are all simply the result of purposeless events. So of course the universe is not biological but the universe is physical and life is a part of this physical universe. They all follow the same rules of physics and all emerged with no purposeful reasons.

So why consciousness might not be one of the purposeless events that appeared and never disappeared with no specific reason?"

Stevan Hamad

"Adaptive traits can start as random mutations, or, more often, and changes in existing developmental processes; they may already be there (because of some other, possibly expired adaptive function) and their newfound adaptiveness could be because of a new environmental change."

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**Pauline Claude** 16 July 2012 02:26

**POSTED ON FACEBOOK**

GUILLAUME LOIGNON:

"To expand from Searl's interesting comments about summer vacations and what exists by itself, here's a recent paper by Dennett about analytic metaphysics, what is real, and what depends on the observer.

http://iasc.tufts.edu/cogstud/papers/kindsofthingsfin.pdf"

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**Pauline Claude** 16 July 2012 02:50

Why keep using the robot argument to discredit the utility of consciousness?

As Searl nicely mentioned, it cannot be a good argument because consciousness as we study it is consciousness in the context of living beings and as living beings are the result of evolution it cannot be compared with robots.

And what if consciousness was a biological "constraint" (in the sense that it appeared, was not necessarily deleterious but remained and evolution had to cope with it) and that all the abilities we have now and require consciousness (e.g. language, decision making, senses, etc...) would have evolve coping with consciousness even though consciousness was not absolutely necessary?

If you think a bit more, another reason to argue that the robot argument is not a good one is that if you remove any piece of consciousness of a human being, unfortunately, this human would be unable to do anything, therefore, consciousness is necessary to a human being's life, meaning that consciousness has to have an adaptive function.

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**Rachid Belkouch** 16 July 2012 13:31

If you remove his consciousness, a human being would be closer to a vegetable than to a robot. But thinking about a conscious robot is as thinking about a conscious vegetable. It doesn't make any sense.

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**Pierre Vaudais** 16 July 2012 18:05

Well, I beg to differ. Turing asked the question: "Can machines think?" and many rephrased the question with a computationalist or a connectionist twist. For a robot to pass the Turing test, it better be conscious. To be able to do it, one certainly has to define consciousness and understand its functionality (if not its function).

I don't think "the robot argument [is there] to discredit the utility of consciousness", it shows all the functions that can be done without consciousness, hopefully helping to zoom in on the "function" of consciousness. And I tried to emphasized that language, not just speech, grounded language is impossible (for now) in
robots...

Pauline Claude  18 July 2012 04:59
Well Pierre, I 100% agree with you on the language argument. However, some people keep hardly thinking that language doesn't necessitate consciousness because they use the robot argument...

Also, when I said "discredit", I meant that some people tend to say that consciousness doesn't have any adaptive function because in theory a robot can do anything a human can do without consciousness. But I keep wondering: if we are able to create that behaves, in every single aspect, as human do, would we have created a conscious robot?

Pierre Vadnais  18 July 2012 05:36
To me, that's the magic of the Turing test. Not sure that Turing realized that his test based on verbal communication implied understanding consciousness. No robot could ever be penpal with Stevan without being conscious. It is possible to program the most extensive dictionary into a robot and make it utter the nicest arguments, but none of that will be grounded as Stevan himself keeps reminding us.

The grounding of words, and even more of sentences, requires not only learning but understanding... and understanding is synonymous with consciousness (NOT with feeling).

To answer specifically your question: a robot that behaves, in every single aspect, as human do, would have to be conscious. The Turing test is the same as "behaving, in every single aspect, as human do".

Xavier Déry  31 July 2012 12:09
Searle says the ontological subjectivity of consc. is not an obstacle to understanding it from an epistemic objective POV: science

Thierry Laurion  31 July 2012 16:52
I remember vaguely that Searle talked about the photon being a wave and a particle at the same time in theory, but in practice, only one of the two can be seen by an observer. Can someone give more details about that?

Was it used as an example to say that consciousness would only be seen as neuronal interactions when an observer would look at it?

This article made me perplex.
http://en.wikipedia.org/wiki/Wave_functionCollapse

Stevan Harnad  4 August 2012 18:37
QUANTUM KOANS

Forget about wave/particle duality. It is quantum mechanics's "hard problem" but it has nothing to do with our hard problem. Every time someone brings it up, it's a red herring. A problem is not solved by conflating it with yet another unsolved problem...

Nico Sheppard-Jones  31 July 2012 18:24
For my own understanding of consciousness, Searle's "jargon" was actually quite enlightening. I was looking at my notes though, and something is unclear to me.

I understand that (1) all observer-relative phenomena are created by consciousness. But is this enough of a reason to say that (2) consciousness itself cannot be explained in observer-relative terms? Either something I missed, or just makes me feel strange to assume that (2) follows from (1)...

Eric Muszynski  5 August 2012 07:26
The comparison of consciousness with vitalism has been brought up many times, but is not quite appropriate; whereas the vitalists assumed with no empirical backing that there was some extra magic involved in life itself, consciousness clearly does exist since we each of us have it.

Thus although mechanical (chemical, biological, whatever) operations can explain life, it is not a given that they can explain consciousness, because of all the reasons given in Harnad's talk.

Roberto Gulli  14 August 2012 17:37
I may be missing the nuance differentiating two things Dr. Searle said, lest they be contradictory.

When talking what he considered to be facts about consciousness, Dr. Searle stated that is is real and irreducible; further, since consciousness has a subjective ontology, it cannot be reduced or explained using a third-person ontology. Later, Dr. Searle states that we will only understand consciousness as a natural biological phenomenon that can be described at many levels (and subsequently gave the example of the car with the pooched spark plug, alternately described as an insufficient movement of electrons unable produce the electric arc required for the oxidation of hydrocarbons).

To me, these two statements seem incongruous. Sure, the experience of consciousness is entirely subjective — but if one believes that consciousness is caused by activity of the brain (which we all do believe), this activity can be observed in the third-person, and thus consciousness can be described as a natural phenomenon at more than one level. Consistent with Dr. Searle's second point, consciousness can be described as a natural phenomenon at more than one level, and in contradiction to his first only one of these levels is the subjective experience. Other perspectives would be welcomed on the matter.

X. Measuring Consciousness (Monday July 9)
CLOSING SUMMARY & DISCUSSION

Posted by Stevan Harnad
6 comments:

Pauline Claude 10 July 2012 19:27
Why consciousness? why life? why the universe?

Pauline Claude 10 July 2012 19:31
COMMENTS COPIED AND PASTED FROM THE CORRESPONDING POST ON FACEBOOK:

Stevan Harnad:
*The universe is not a biological trait, hence no adaptive function. Life is a precondition for adaptive function (though it's possible that the self-replicative property of genes is at the root of adaptive function). But feeling (consciousness), like feeding and flying, is a biological trait. Hence it is natural to ask what is its adaptive function (i.e. "why?").*

Pauline Claude:
*Actually it was not "why" for the adaptive function but rather why it appeared first? Any biological traits that appears and is maintained by natural selection actually did not appeared because it was adaptive. A trait appears first by mere chance, exactly as life probably did and exactly as the universe probably did. I agree they are maintained because they appeared to be adaptive but they surely didn't appear because they were adaptive. There are all simply the result of purposeless events. So of course the universe is not biological but the universe is physical and life is a part of this physical universe. They all follow the same rules of physics and all emerged with no purposeful reasons. So why consciousness might not be on the purposeless events that appeared and never disappeared with no specific reason?*

Stevan Harnad:
*Adaptive traits can start as random mutations, or, more often, and changes in existing developmental processes; they may already be there (because of some other, possibly expired adaptive function) and their newfound adaptiveness could be because of a new environmental change.*

Jules Pelletier 16 July 2012 18:01
These reflexions actually pose 2 different problems:

1) The threshold between mere reflexes and self-consciousness:
As everything biological nowadays, consciousness is the result of evolution. Nobody denies that, of course. But as a product of evolution it must have been preceded by earlier forms of reactivity. Where then is the limit, the frontier between consciousness and simple motor or chemical reflexes? As Dr. (or prof., apologies given) Sossen and Edelman exposed through their works, different types of "consciousness/reactivity" exist throughout the animal kingdom. The tough part is pinpointing the precise limit of each domain. Finding and defining precisely different types of animal consciousness/reactivity is a key part of understanding our own consciousness. Just as the coelacanthe is at the hinge of underwater and overwater breathing (it actually has both gills and lungs), there must be animals stuck in an ecological niche where both consciousness and mere reflexes are still interwoven tightly. So research in that general direction is very important to consciousness studies.

and 2) the adaptive advantage of consciousness:
Even though consciousness might be a by-product of evolution, it has got to confer an advantage in certain niches over mere reflexes. As Bjorn Brembs exemplified through fishes' C-start reflexes exploited by anacondas, motor reflexes are not enough to be a successful part of the food chain. The key to research in that area has then got to be finding which cognitive activities cannot be accomplished (or just not as effectively) without consciousness.

Thierry Laurion 31 July 2012 16:45
TO Pauline Claude:
Why consciousness? why life? why the universe?
I remember the answer being 42.

Ask google: "the answer to life the universe and everything" and see for yourself.

:) 

Carey YL Huh 15 July 2012 12:21
Hi Pauline and Dr. Harnad (and everyone else reading this!),
I thought it may be good to share this TED talk by Dr. Jill Bolte Taylor:

In her own way, she connects her brain, the consciousness and the universe!! by relating her personal story about having a stroke in her left hemisphere. I found it truly interesting how the two hemispheres can be thought to have different personalities and even different consciousness-es!

Carey

PS: I truly enjoyed the summer school and I would like to thank you and all of the volunteers, organizers that worked so hard to bring it to life! Thank you so much!

Xavier Déry 31 July 2012 12:10
Searle: "memory organizes consciousness" so many implications to these three words