Theories of consciousness that neuroscientists take seriously

Three theories of consciousness <

Explanatory gap
Difference between first order & higher order
Transitivity Principle
Ambitious vs Modest higher order
Ambitious higher order theory ad hoc
Neuroscience
Psychology

Higher Order Theory

State about the pain

pain

What makes a pain conscious is that there is **another state** which is about the pain

Higher Order Theory

State about the pain

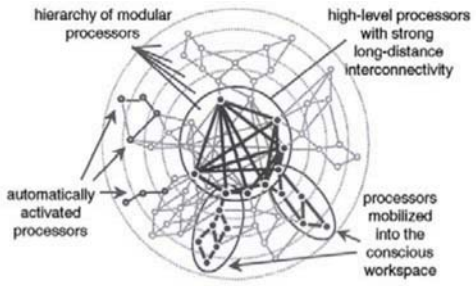
What makes a pain conscious is that there is **another state** which is about the pain

Figures removed due to copyright restrictions.

Global Workspace Theory

Figures removed due to copyright restrictions.

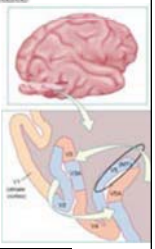
Dennett: "fame in the brain"



Biological theory: Consciousness = neural state

Content of, e.g., visual experience of motion = recurrent loop from MT+ to V1 or V2

Figures removed due to copyright restrictions.



What makes that content conscious =
- High activation
- Cortico-thalamic loop
- Special type of computation
- Activation of "self" circuits

Intuitive Advantages

- Global Workspace
  - Captures common sense idea that a conscious state is one that can be reported, remembered, used in reasoning, guides action, etc.
- Higher Order
  - Captures intuitive Transitivity Principle: A conscious state is a state that one is conscious of being in.
- Biological
  - Captures observation that there seems more in consciousness (in quantity and fineness of grain) at any moment than can be captured in thought or globally broadcast

Point of view of biological theory

- Production of global broadcasting and higher order states are things consciousness does, not what consciousness is.
- Higher order views are too intellectual—consciousness is something simpler

What proponents considers advantages of HO view can equally be considered advantages of a first order view that also recognizes higher order states that have top-down effects

Higher order state

v

First order phenomenal consciousness

Extremely important fact about debate: Biological and Global broadcasting views recognize a special higher order kind of consciousness

Challenge to HO theorists: find advantage of HO accounts that are not equally advantages of first order accounts that allow top-down effects on phenomenal consciousness

Three theories of consciousness
Explanatory gap <
Difference between first order & higher order
Transitivity Principle
Ambitious vs Modest higher order
Ambitious higher order theory ad hoc
Neuroscience
Psychology

That there **seems** a deep problem does not depend on any controversial theory of consciousness

The experience is subjective
The brain state is objective

How can something subjective be something objective?

Figure removed due to copyright restrictions.

Global workspace answer: the experience of blue is phenomenally conscious ⇔ it is globally broadcast

Nothing more for neuroscience to explain

HOT answer to Explanatory Gap: the experience of blue is phenomenally conscious ⇔ restricted causation of a HOT about it

Nothing more for neuroscience to explain

Short argument:
Only biological view can recognize the depth of the Explanatory Gap; so it is better

GW & HOT views reduce Hard Problem to Easy Problems

Thought that I am seeing a red apple — aboutness — Representation of red apple in same mind as HOT

All these ingredients can exist unconsciously

Suppose neuroscience explains:

What thought is and how it occurs

How aboutness is realized in the brain

How red is represented

Neuroscience will not predict anything special happening when these phenomena happen together

Thought that I am seeing a red apple — aboutness — Representation of red apple in same mind as HOT

All these ingredients can exist unconsciously

Suppose neuroscience explains:

What thought is and how it occurs

How aboutness is realized in the brain

How red is represented

[redacted]

- Three theories of consciousness
- Explanatory gap
- Difference between first order & higher order
- Transitivity Principle
- Ambitious vs Modest higher order
- Ambitious higher order theory ad hoc
- Neuroscience
- Psychology

- Biological
- Global Workspace
- Higher Order

First order

Challenge to both first and higher order views

What exactly is the difference?

First order view: 2 kinds of consciousness, phenomenal and reflective

Figures removed due to copyright restrictions.

Higher order view: One kind of consciousness, phenomenal = reflective

DR: what NB calls phenomenal consciousness without reflective consciousness is just a case of an unconscious quality

From the first order point of view

Phenomenal consciousness is first order;
Reflective consciousness is higher order

What is phenomenal consciousness?

What it is like to, e.g. see a sunset

Figure removed due to copyright restrictions.

What is what it is like?

Figure removed due to copyright restrictions.

Add: Higher order c

…`consciousness' does not admit of a definition ... Nonetheless, it is important to say exactly what we are talking about because the phenomenon of consciousness that we are interested in needs to be distinguished from certain other phenomena such as attention, knowledge, and self-consciousness. By `consciousness' I simply mean those subjective states of sentience or awareness that begin when one awakes in the morning from a dreamless sleep and continue throughout the day until one goes to sleep at night or falls into a coma, or dies, or otherwise becomes, as one would say, `unconscious'.

Pinning down phenomenal consciousness

- The subject of the explanatory gap
- Basis of what Mary learns
- What is important in suffering

Phenomenal consciousness is the basis of the explanatory gap

The experience is subjective
The brain state is objective

How can something subjective be something objective?

Figure removed due to copyright restrictions.

Jackson's "Mary" argument

- Mary knew all the physico-functional facts about color vision in the black and white room
- Mary learns (comes to know) a new fact: what it is like to see blue
- So there must be facts about color vision that are not physico-functional facts

"I am so glad to see blue, finally."

Phenomenal consciousness is the basis of what Mary learns

Figures removed due to copyright restrictions.

Pinning down phenomenal consciousness

- The subject of the explanatory gap
- Basis of what Mary learns
- What is important in suffering

- If a dog or a 1 year old baby or a 2 year old deaf child or an autistic adult suffers but has no higher order state, I say that suffering is bad in itself, whereas higher order theorists have to say it is unconscious so only bad in its effects.

Figures removed due to copyright restrictions.

Pains in cattle, sheep, pigs and chickens are not "felt" and hence are of no moral significance*

Figure removed due to copyright restrictions.

Phenomenal consciousness is the basis of what is bad about suffering

*Carruthers (1999) says frustration of animal desires are of moral significance, but does not take back claim about animal pain

Figures removed due to copyright restrictions

- Basis of what Mary learns
- The subject of the explanatory gap
- What is important in suffering

Mary learns what it is like to see red, not what it is like to think about seeing red.

Representation and thought are not completely mysterious from a scientific point of view.

What is important in suffering is the first order suffering, not thinking about it.

Issue of how to distinguish first and higher order theories often dissolves in practice

Figures removed due to copyright restrictions.

Brain activation while watching movie. Little activation in frontal areas

Figures removed due to copyright restrictions.

"No cortical area appeared to be co-active during both self-related and sensory perception tasks. Furthermore, examining the activity of the pre-frontal system during the rapid perceptual tasks revealed significant inhibition in these areas below the resting base-line. So not only are prefrontal areas disengaged from perceptual awareness, they are actually inhibited during conscious perceptual awareness. The results are actually compatible with the strong intuitive sense we have of «losing our selves» in a highly engaging sensory-motor act."

Figures removed due to copyright restrictions.

Problematic for global workspace accounts too

No problem distinguishing first and higher order views in practice

We are absolutely certain that we have phenomenal consciousness when we watch a Clint Eastwood movie

We are not certain that we have higher order states about those phenomenally conscious states

Figure removed due to copyright restrictions

- Three theories of consciousness
- Explanatory gap
- Difference between first order & higher order
- Transitivity Principle <
- Ambitious vs Modest higher order
- Ambitious higher order theory ad hoc
- Neuroscience
- Psychology

Transitivity: A conscious state is a state one is aware of being in

- There are 3 accounts, only one of which is higher order

A conscious state is a state one is aware of being in

HO Deflationary Same Order

?

David Rosenthal
David Armstrong
Ernest Sosa
Peter Carruthers Bill Lycan

Aristotle Franz Brentano
Victor Caston David Smith
Tyler Burge Bob van Gulick

Figures removed due to copyright restrictions.

Deflationary

"Just as one automatically jumps one's jumps, smiles one's smiles, and dances one's dances, however, so one experiences one's experiences. And since experiencing is a form of awareness, one is thus in one sense automatically aware of one's experiences, precisely in experiencing them"

Figure removed due to copyright restrictions.

Trivial automatic awareness of experience distinct from actually noticing an experience

HO View

State about the pain

Agrees with HOT: what makes an experience conscious is that one is aware of it

A conscious experience is reflexive in that it consists in part in an awareness of itself

- Three theories of consciousness
- Explanatory gap
- Difference between first order & higher order
- Transitivity Principle
- Ambitious vs Modest higher order <
- Ambitious higher order theory ad hoc
- Neuroscience
- Psychology

Modest vs. Ambitious HO views

Modest: ∃ a number of senses of 'conscious', including
- Phenomenal Consciousness
- Reflexive Consciousness

OK with me

Ambitious

phenomenal consciousness can be to reflexive consciousness, either empirically or a priori

Cannot hear "a natural sense of the phrase "conscious state" other than as meaning "state one is conscious of being in"

Ambitious HO accounts are conceptually and empirically problematic

Am I saying HOT theory is false?

- Either a postulation (modest version)
  - but there is a better modest version
- Or if ambitious, faces conceptual and empirical difficulties

A theory of reflexive consciousness

A theory of phenomenal consciousness

Imagining falsifications

- Pain without a thought about it or about oneself

Consciousness w/o HOT

Imagining falsifications

- Losing oneself in an intense experience

Figure removed due to copyright restrictions

Consciousness w/o HOT

Figure removed due to copyright restrictions.

Consciousness w/o HOT

Imagining falsifications

- Biofeedback allows people to know that their blood pressure is going up without knowing how they know
- Perhaps the same machinery coupled to fMRI would allow knowledge of unconscious perceptions via another internal route

HOT w/o Consciousness

Freudian Theory

Freudian unconscious thought that directs repression

Freudian unconscious desire to murder my father and marry my mother

- Sophisticated dreamwork, e.g. coding key subjects in anagrams

HOT w/o Consciousness

Conceptual

Empirical

Figure removed due to copyright restrictions.

- Three theories of consciousness
- Explanatory gap
- Difference between first order & higher order
- Transitivity Principle
- Ambitious vs Modest higher order
- Ambitious higher order theory ad hoc <
- Neuroscience
- Psychology

OK if purely nominal

Puzzle: sensation of green causes HOT to the effect that one has a sensation of red. What is the phenomenology?

Phenomenology goes with…

1st **order** Both 2nd order

Close to: thinking makes it so

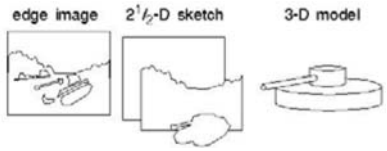
The unconscious states we know about are hard to make conscious:

Figures removed due to copyright restrictions.

1. Chomskyan grammatical machinery
2. Modular perceptual states
3. The states psychiatrists unearth

- But HOTs are easy to make conscious

Mystery, unless concerns a way of talking rather than a natural kind



Why does HO relation to one's own mental states make the mental states conscious-- but not rocks? And not others' mental states?

Ad hoc to postulate HO only has this relation to

•mental states

•that are one's own

- Since same order relation is reflexive, the only thing the relation can be a relation to is a mental state

Figures removed due to copyright restrictions.

Same advantage for deflationary view

HO Solution

Figures removed due to copyright restrictions.

Same order Solution

Deflationary solution

- All that awareness comes to is the trivial fact that one experiences one's experiences. Trivial fact not true for rocks

- Three theories of consciousness
- Explanatory gap
- Difference between first order & higher order
- Transitivity Principle
- Ambitious vs Modest higher order
- Ambitious higher order theory ad hoc
- Neuroscience <
- Psychology

Anton's Syndrome

Suppose: "I am now seeing something"

Must she in fact be experiencing hearing?

Figure removed due to copyright restrictions.

Evidence against hallucination as a general account of anosognosia

- Ventromedial patients clearly fit the pattern of confabulation, a cognitive deficit usually considered a response to the need to eliminate cognitive dissonance and enhance self-image
  - Anosognosia for prosopagnosia
- Debriefing after recovery

Anton's syndrome

However, McDaniel and McDaniel (1991) argued that generalised intellectual decline was not a necessary pre-condition for Anton's syndrome (see also Stuss, 1991; Stuss & Benson, 1986) and they reported a case of a patient who was well-orientated to time and place, had a normal digit span, normal language comprehension and naming, intact ability to perform calculations, showed good constructional ability, and yet denied her visual problems. The patient did, however, perform poorly on tests of frontal/executive skills and recent and remote memory. McDaniel and McDaniel's (1991) patient is particularly interesting because it is one of the few reports of Anton's syndrome in a case of peripheral blindness rather than cortical blindness. The patient had no visual acuity or light perception in the right eye and she did not respond to visual threat. Visual acuity, extraocular movements and a direct light pupillary response were normal in her left eye. She denied her right-sided blindness and confabulated responses. For example, when asked to count the number of fingers in front of her she guessed and, when informed that she was incorrect, she blamed her poor performance on a headache, the lighting, or the angle of the bed.

Suppose: "I am now seeing 3 fingers"

Must she be having a visual experience of fingers?

Figure removed due to copyright restrictions.

Anosognosia for Prosopagnosia

"SPs face processing impairment remained stable across a 20-month period of investigation…, during which one of the most striking features was her complete lack of insight into her face recognition difficulties. She was not distressed by her inability to recognize many familiar faces, and maintained that she recognized faces 'as well as before'. Her denials of her face recognition impairment were made expressions of mild surprise or disbelief if we continued to suggest that there might be any problem. She maintained that she had no problem in recognizing faces in everyday life, in paintings, on the television, in newspapers or magazines….She had been a talented amateur artist, specializing in portraiture. After her illness, though, she could only recognize the portraits she had painted by careful deduction from the sitter's age, sex, background details, etc. When asked about her inability spontaneously to recognize her own paintings, she commented only that she 'had recognized them', and did not seem to think that there was anything unusual about the laborious method she used to achieve this." (Young & Dehaan, 1992)

Suppose: "I am now experiencing face recognition"

Must she in fact be experiencing face recognition?

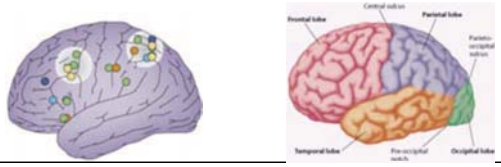
Upshot of anosognosia

HO view seems to have to embrace a position on an empirical issue that goes against the main thrust of the science

Crick-Koch basic postulate

- We can study visual consciousness in cats and monkeys because their visual systems are fairly similar to ours despite the huge cognitive differences reflected in differences in frontal lobe function.

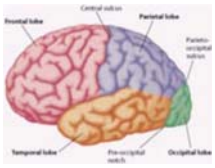
Figures removed due to copyright restrictions.



Daniel Pollen, "Fundamental Requirements for Primary Visual Perception," *Cerebral Cortex* 18 (9), 2008

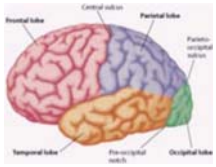
Figure removed due to copyright restrictions.

"I apply the term 'primary visual perception' (PVP) to refer to our most basic subjective experiences of brightness and color that are sometimes referred to as 'qualia'…**Are prefrontal cortices essential for primary visual perception? …**The above results supported the longstanding neurological views that prefrontal cortical areas are concerned with the abstract and symbolic significance of a stimulus, not with its basic sensory qualities (Goldstein, 1936). Also lost after frontal lesions is the organized exploratory visual scanning activity with respect to a complex object rather than any disturbance of basic visual perception (Luria et al., 1966). The ability to manipulate the meaning of sensory data, to organize it appropriately with respect to the past history of the individual and his/her future needs is also lost after prefrontal lobotomy (Milner, 1982). These functions of prefrontal cortex are attributes of higher-order consciousness related to symbolic content **not of PVP**."



Even if visual consciousness is different in patients who have a lot of frontal damage, still HOT theory is supposed to apply to all consciousness.

Figure removed due to copyright restrictions.



High ratio of perceptual synapses to frontal synapses

High ratio of frontal to perceptual synapses

Myelination too

24.08J / 9.48J Philosophical Issues in Brain Science
Spring 2009