

Conscious Entrainment

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Sampling Conditions:

- 1 Have not read the paper (or another paper of mine on this topic).
- 2 Have a skill.
- 3 Remember an experience while performing that skill, but no other simultaneous task.
- 4 That experience is unlike your experience as a novice in one or more ways.
- 5 Question: In what ways is this experience unique?

Motivation

The debate on whether there is consciousness outside of attention has so far centered on a particular form of conscious experience: perceptual experience during the performance of a novel task (e.g. Sperling, Mack & Rock). Yet novel tasks are known to be more attention-involving than skilled tasks. I thus explore the conscious experiences associated with skilled tasks to discover whether consciousness might occur outside the influence of attention.

Basic Claim

Some forms of **conscious experience** do not require **top-down attention** (e.g. *conscious entrainment*).

Outline

- 1 Working Definitions
- 2 The Debate So Far
- 3 Conscious Entrainment
- 4 Objections
- 5 Summary

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Conscious Experience

Temporally-extended experience that transcends mere arousal but need not necessarily correspond with self-awareness, situational awareness, propositional knowledge, or episodic memory.

Ostensive Definition: that which separates dreamless sleep from dreaming.

Top-Down Attention

An act of prioritization by the subject. It is often described as being "endogenous" or "voluntary." It is but one way of altering the distribution (amount and concentration) of neural and/or mental resources. Corresponds with neural bias from prefrontal feedback (e.g. from the dlPFC).

Ostensive Definition: that which separates looking from seeing and listening from hearing.

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The Necessity Claim

Attention is necessary for consciousness.

Global Workspace Theory: (1) consciousness occurs when top-down attentional amplification brings an unconscious neural population into the global workspace, bringing about (2) high interconnectivity between these brain areas, which is the neural correlate of consciousness (e.g. Dehaene & Naccache 2001).

Supporting Evidence: (1) the presumed difference in top-down attention between perceiving and not perceiving a stimulus in Inattentional Blindness (e.g. Simons & Chabris 1999, Mack & Rock 1998); (2) the difference in brain activity between the Vegetative State and the Minimally Conscious State (e.g. Boly et al. 2011).

Rejecting the Necessity Claim

(Against 1) High connectivity can be brought about without attention, as in the case of stimuli with high salience and short exposure times, such as perceptual gist (e.g. Koch & Tsuchiya 2007).

(Against 2) Consciousness does not rely on the high connectivity of access, as in the case of (pure) phenomenal consciousness, demonstrated in the Sperling/Landman experiments (e.g. Block 2008).

Problems and a New Way

Perceptual gist has been shown to occur both with and without attention. In those cases where it has been shown to occur without attention, it has not been shown to be conscious, and there are some reasons to think it might not be consciously perceived in those cases.

The Sperling/Landman cases could be described as low access cases, rather than no access cases, undermining the support for pure phenomenal consciousness.

These and other cases examine perceptual experience during novel tasks. But this is the very type of conscious experience that has been linked with attention. Thus, a better way to make this case might be to examine conscious experience during skilled tasks, which are known to use little to no attention.

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Why Skill?

“A major factor of human cognition is that certain behaviors can be performed with little, if any, attention, whereas other behaviors are very sensitive to attentional allocation. The ‘low attention’ behaviors are referred to as automatic processes or behaviors” (Schneider et al. 1994, 177).

Dual-task studies have long demonstrated that habituation decreases interference between concurrent tasks, eventually allowing one to perform two or more tasks at the same time with no noticeable performance loss to either task (see, e.g., Hirst et al. 1980). In these dual-task studies, the decrease in behavioral interference has been found to correspond with reduced activation in prefrontal areas (e.g. Poldrack et al. 2005). This reduced activation in the prefrontal areas is consistent with a reduction in attention.

Definition

“The experience of being entrained to a task, as though one has no other interests or tasks. Driving is a typical example of a task to which we are easily entrained, allowing us to direct our experience more fully to other tasks...If instead of directing our experience elsewhere we felt entirely absorbed by the task of driving, we would be enjoying conscious entrainment, rather than mere behavioral entrainment.”

Central Characteristics

An experience that occurs during the performance of a habitual, skilled activity such that:

- 1 “The relationship between the subject and task is one of **total focus**: all of the subject’s mental resources are concentrated on the task. This characteristic distinguishes conscious entrainment from partial entrainments, wherein the subject may be performing multiple tasks at once.”
- 2 “This focusing of one’s mental resources onto the requirements of the task is **effortless** and seems beyond one’s direct control.”
- 3 There is **no subject-object divide**, which is a characteristic structure of experience during the performance of novel tasks.

Phenomenological Evidence

Experiential shifts:

Painter Jackson Pollock: “When I am **in** my painting I am **not aware of what I am doing**” (Janson & Janson 2003).

Race car driver Ayrton Senna: “Then suddenly something just kicked me. I kind of woke up and realised that I was in **a different atmosphere** than you normally are...It frightened me because I was well **beyond my conscious understanding**” (Orosz 2010).

Baseball player Chuck Knoblauch: “I couldn’t overcome it. I got to **thinking too much**, and I couldn’t shut it off” (Rayno 2014).

Empirical Evidence

Dual-task studies:

“There is extensive evidence in the functional imaging literature that the neural substrate for automatic processing **is distinct** from that involved in controlled processing” (Saling and Phillips 2007: 15-16).

“Controlled or ‘goal-directed’ action has been found to correspond with an ‘associative network’ that includes the prefrontal areas, whereas automatic or ‘stimulus-based’ response has been found to instead correspond with a ‘sensorimotor network’ that has **distinct** cortical and subcortical elements” (Yin & Knowlton 2006: 469).

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The Challenge from Memory

Complete conscious entrainment is postulated to occur without the access of attention. Without direct access, this makes it unlikely that subjects will be able to report much content from these experiences. Can “memory that” serve as evidence that these experiences are conscious?

A Case Study: a “world renowned” and “highly proficient” cellist had transient memory loss following a difficult performance, including the performance of a piece that is considered to be “one of the hardest cello pieces ever written” (Thakur & Ropper 2011). The cellist played the pieces perfectly and also tuned the cello between the performances, despite being unable to recall anything about the performance directly after it or even days later.

The Challenge from Self-Refutation

Might conscious entrainment involve low-level attention, rather than no attention?

- Conscious entrainment is experienced as different in kind from “normal” conscious experience.
- One central characteristic of conscious perception missing in conscious entrainment is the felt divide between subject and object.
- One emerges from conscious entrainment as though waking.
- When one emerges, one struggles to regain control over the activity.

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Summary

- Conscious entrainment is the conscious experience associated with habitual, skilled activity.
- The performance of habitual tasks is known to use little to no attention.
- Automatization is the endpoint of such habituation, which has neural processing distinct from that of controlled behaviors.
- Reports from those who have had experiences of conscious entrainment note a difference in kind from “normal” conscious experiences.
- Thus, conscious entrainment serves as new evidence for conscious experience outside of attention.

Thank you.

Response to Comments

- 1 Is there an inconsistency between the condition I propose for automaticity and the total focus characteristic of conscious entrainment? **No, because this is a sufficient condition for automaticity.**
- 2 Can expanding the notion of attention to include (pure) bottom-up attention allow one to avoid the conclusion? **No, because this form of attention cannot explain the maintenance of focus in conscious entrainment.**
- 3 Can attention at expanding levels better describe these cases? **No, because of the structural differences in conscious entrainment.**