

Response to Kouider *et al.*: which view is better supported by the evidence?

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Kouider *et al.* [1] argue that the information in the brain that explains partial report superiority is unconscious. I say that it is conscious [2]. Kouider *et al.* also argue that my view is unfalsifiable, whereas theirs is more parsimonious, makes predictions and can be falsified empirically. Actually, the same experimental evidence is relevant to both positions.

Kouider *et al.* are mistakenly appealing to falsifiability (i.e., definitive disproof) rather than support by the evidence. Definitive disproof rarely, if ever, occurs in science. The Poisson bright spot was once thought to provide definitive disproof of the particle theory of light [3], but subsequent developments showed otherwise.

Participants in the partial report experiments have a capacity of about 10.5 items in the Sperling task and up to 15 items in the Amsterdam tasks as compared with a cognitive access (working memory) capacity of 3-4 (for items of comparable level of complexity) [2]. Specific representations encode letters with enough detail to decide among the 26 letters of the alphabet and encode rectangles with enough detail to decide orientation in the Amsterdam experiments.

Is the specific information necessary for the partial report superiority unconscious, as Kouider *et al.* claim, or conscious, as I claim? Instead of confronting the actual evidence, Kouider *et al.* appeal to an 'observer effect' that 'might' render the issue immune to scientific investigation. My argument [2] appealed to direct evidence [4] that unconscious working memory is too weak to account for these capacities (among other pieces of evidence). A problem in that evidence [4] is that the perception was made unconscious by masking, thereby weakening the percept. However, other paradigms indicate that even when unconscious perceptions are strong, they decay rapidly (Carmel, D. *et al.* (2011) Fast unconscious fear acquisition. Presentation at the 15th Meeting of the Association for the Scientific Study of Consciousness). In addition, Sligte *et al.* [5] provided evidence for persisting representations in V4 but not in the early visual areas (V1, V2 or V3), where one would expect them if they were unconscious. These experimental points reflect the methodology that I endorse: holistic consideration of which hypothesis is better supported.

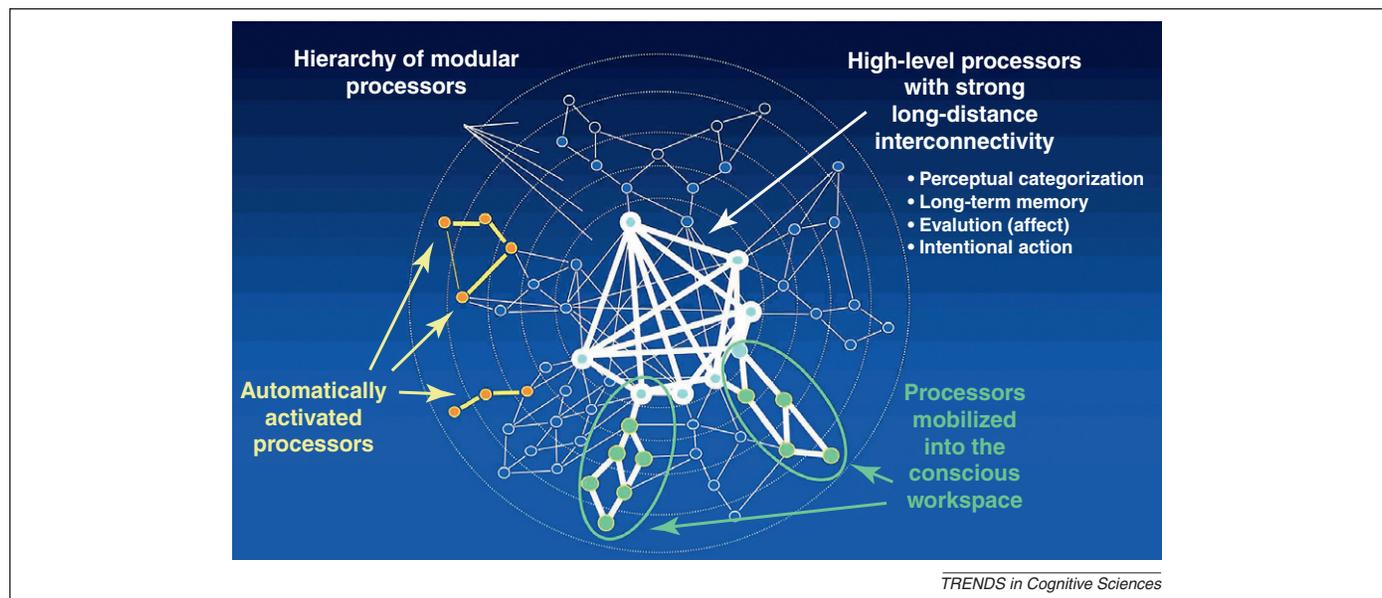


Figure 1. Access vs. accessibility. The distinction between cognitive access and cognitive accessibility can be illuminated by reference to the global neuronal workspace model [10], a model that purports to explain how sensory information can become widely available to mechanisms of reporting, decision making, and control of action. Dots and lines in the outside rings indicate sensory activations and their connections, whereas dots and lines in the center of the diagram indicate workspace activations. The thicker lines and dots indicate greater activation. Neural activations in the sensory areas compete with one another to 'ignite' reverberatory activity in the center which in turn maintains the peripheral sensory excitation until a new dominant coalition wins out. The sensory activations can be thought of as 'suppliers' of representations, whereas the central workspace neurons are 'consumers' that feed to mechanisms of reporting, reasoning, evaluating, deciding, remembering, and control of action. Dominant neural coalitions involving the workspace are accessed, whereas the weaker activations that could be activated by a shift of attention are merely accessible. Figure courtesy of Stanislas Dehaene.

According to the hypothesis Kouider *et al.* put forward, what is in consciousness before the cue are generic representations plus specific representations that are too sparse to provide the information necessary to explain partial report superiority. However, on their hypothesis one would expect a substantial error rate concerning the uncued items. However, Kouider *et al.* [6] found the error rate to be small: their own evidence counts against them.

Overgaard and Grünbaum [7] agree with Kouider *et al.* that data are irrelevant. They claim that the disagreement depends on pre-empirical intuitions about whether consciousness is cognitive or not and argue that cognitive conceptions of consciousness are supported by a strong intuition that it makes no sense to ascribe consciousness when the subject denies it. We disagree about the value of this intuition (as well as about the value of pre-empirical intuitions in general) but fortunately the value of these intuitions is not at issue in this debate. (I have mentioned the possibility of inaccessible consciousness in other work [8], but not in the overflow argument as explained in [2].) Overgaard and Grünbaum [7], much like Cohen and Dennett [9], are conflating access with accessibility (see Figure 1 for an illustration of this distinction). Subjects in the overflow experiments do not deny consciousness of the

items and all or almost all of them are accessible – even though, necessarily, most items are unaccessed, none are inaccessible.

References

- 1 Kouider, S. *et al.* (2012) Do we still need phenomenal consciousness? Comment on Block. *Trends Cogn. Sci.* DOI: 10.1016/j.tics.2012.01.003
- 2 Block, N. (2011) Perceptual consciousness overflows cognitive access. *Trends Cogn. Sci.* 15, 567–575
- 3 Holton, G.J. and Brush, S.G. (2001) *Physics, the Human Adventure: From Copernicus to Einstein and Beyond*, Rutgers University Press
- 4 Soto, D. *et al.* (2011) Working memory without consciousness. *Curr. Biol.* 21, R912–R913
- 5 Sligte, I.G. *et al.* (2009) V4 activity predicts the strength of visual short-term memory representations. *J. Neurosci.* 29, 7432–7438
- 6 de Gardelle, V. *et al.* (2009) Perceptual illusions in brief visual presentations. *Conscious. Cogn.* 18, 569–577
- 7 Overgaard, M. and Grünbaum, T. (2012) Cognitive and non-cognitive conceptions of consciousness. *Trends Cogn. Sci.* DOI: 10.1016/j.tics.2011.12.006
- 8 Block, N. (2007) Consciousness, accessibility, and the mesh between psychology and neuroscience. *Behav. Brain Sci.* 30, 481–548
- 9 Cohen, M.A. and Dennett, D. (2011) Consciousness cannot be separated from function. *Trends Cogn. Sci.* 15, 358–364
- 10 Dehaene, S. and Changeux, J. (2011) Experimental and theoretical approaches to conscious processing. *Neuron* 70, 200–227

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