The second issue deals with the types of neural processing that are sufficient for awareness. As has been claimed before [6,7], F&L believe that local recurrency is sufficient for consciousness, independent of access. They state that if the mechanisms of access were surgically removed while local recurrency was preserved, it would prove 'that consciousness without access exists' (Figure 1 in [1]). Why do they believe this? No reason is provided for why local recurrency must correspond to conscious awareness and not simply to unconscious visual processing. Proponents of the phenomenal-access distinction seem to simply accept it as fact: local recurrency is consciousness. However, what reason is there to accept this?

It is easy to imagine what a conversation would sound like between F&L and a patient (P) whose access to the locally recurrent activity for color was somehow surgically removed.

F&L: 'You are conscious of the redness of the apple.'
P: 'I am? I don't see any color. It just looks grey. Why do you think I'm consciously experiencing red?'
F&L: 'Because we can detect recurrent processing in color areas in your visual cortex.'
P: 'But I really don't see any color. I see the apple, but nothing colored. Yet you still insist that I am conscious of the color red?'
F&L: 'Yes, because local recurrency correlates with conscious awareness.'
P: 'Doesn't it mean something that I am telling you I'm not experiencing red at all? Doesn't that suggest local recurrency itself isn't sufficient for conscious awareness?'

Is this criticism avoided by saying that the hallmark of purely phenomenal states is their being accessible but not actually accessed [8]? Under this view, removing all access mechanisms would be removing phenomenology because phenomenal experiences must be accessible. Again, why consider accessible, yet not accessed, states as being conscious rather than simply the product of unconscious processing? As the dialog above illustrates, such an 'experience' is one that you cannot attend to, base decisions on, remember, or report about. Those are all the products of cognitive access. It does indeed seem to people that there is more in consciousness than they are accessing at any one time, and we know that because they tell us, but the simple act of saying, 'But it seems like I see more!' is itself the product of accessing that information in some attenuated form. What reason is there to think such information is conscious before it is accessed?

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Do we still need phenomenal consciousness? Comment on Block

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In a recent Opinion paper in *TiCS*, Ned Block [1] confronts the recent empirical and theoretical challenges to his distinction between two forms of consciousness (i.e. rich 'phenomenal' vs sparse 'access'). Although we value his attitude of facing these issues, we still believe that the proposed 'unaccessed phenomenal consciousness', which is the cornerstone of this theoretical proposal, remains unfalsifiable and can be accounted for by other, more parsimonious, explanations.

Block argues that the information prior to conscious access (e.g. letters prior to the cue in Sperling experiments) is phenomenally conscious. We have argued in previous work for the impossibility of probing the nature of these so-called 'phenomenal' contents without having subjects relying on some form of access to describe their experience [2,3]. As this would necessarily change the status of these contents, it renders impossible addressing whether they were of a phenomenal or unconscious nature prior to access [4–6]. Thus, an 'observer effect' might potentially render the whole issue immune to scientific investigation [7].

In his recent article [1], Block proposes a new strategy that consists of relying on measures of capacity as indirect evidence for phenomenal consciousness. According to this proposal, rich phenomenal consciousness translates to high capacity, as opposed to the scarce capacity of conscious access. However, Block omits the fact that capacity is a measure of informational availability, regardless of consciousness. As such, capacity may well reflect the amount of information that is unconsciously processed and that can potentially influence the cognitive system.

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We contend that any evidence for phenomenal consciousness, whether it is of a functional or neural type, can be reinterpreted as reflecting either partial awareness (when subjects express the feeling of being able to see more than they can report) or unconscious processing (when subjects are denying any form of awareness but some supposedly indirect marker of consciousness is observed). Block relies on a view of conscious access that is too restrictive. Yet, it is possible to reframe the issue of dissociable forms of consciousness into dissociable levels of conscious access. We recently proposed that an observer's experience involves many (but sometimes inaccurate) components that interact across various levels of representations [2]. For instance, when probed for consciousness, observers can fail to access higher levels (e.g. identity of the letter, words, etc.), but still have access to lower levels (e.g. fragments). Access to higher levels (e.g. letters) might, under conditions of perceptual difficulty (degraded, peripheral, unattended stimuli, etc.), reflect perceptual illusions resulting from the combination of low-level information (e.g. letter-like fragments) with top-down prior expectations. This offers a functional explanation of the impression of seeing a whole array of letters in the Sperling task, now described as a well-grounded perceptual illusion based on partial information.

Block is right to point out that there is more to consciousness than the scarce reports usually obtained in experiments under conditions of focal attention. There are indeed many situations leading, for instance, to the feeling of being able to grasp subjectively a large part of the surrounding world. However, it is not necessary to rely on a distinct and special form of consciousness to describe these phenomena. Functional descriptions might also do the job and, in addition, offer a more parsimonious description that: (i) allows the generation of predictions; and (ii) can be falsified empirically.

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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 aquisition. 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.

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

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