

local recurrency argues that neurons with receptive fields large enough to encapsulate entire objects, bind together features through recurrent interactions, subserving image segmentation and perceptual organization [2]. In the theory of coalitions of neurons [3], neurons engage in the formation of coalitions that represent unified percepts of otherwise distributed information. The functional property that these theories have in common can be loosely summed up as the ability to integrate or bind information across spatially separated sets of neurons to infer perceptual rather than physical attributes of visual stimuli [4,5]. Phenomenal-access theories propose that this property explains key elements of conscious experience, as many observations show that it is characteristic of the emergence of phenomenology [2,6]. Importantly, perceptual organization does not require selective attention [6,7], but rather serves as input for it [8,9]. Thus, although access-only theories allege that representations are only phenomenal when reported, access itself does not seem to be involved in generating the contents of experience, and therefore it has little power to explain phenomenology [10].

Now if it turns out that the neural mechanisms of perception established in our perfect experiment subside when their contents cannot be accessed- as when the green connections in Figure 1 are lesioned out as Cohen and Dennett propose- the idea of phenomenology without access would be falsified. In that case, and only then, access would need to be incorporated into theories of phenomenology. If however, given the stimuli presented in Figure 1, these neural mechanisms continue signaling the perceptual states corresponding to condition A and condition B, even though subjects are not able to report about them, the

parsimonious account is to infer that perceptual states continue to exist without access. According to Cohen and Dennett however, these mechanisms can no longer be trusted to operate as previously established, only because the subject has lost his or her ability to report on them. If anything, rather than disproving the scientific validity of phenomenal-access theories, this step places 'access-only' theories outside the realm of science.

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## Response to Fahrenfort and Lamme: defining reportability, accessibility and sufficiency in conscious awareness

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In their letter to *TiCS* [1], Fahrenfort and Lamme (F&L) bring up two issues in response to our position [2] that we address here.

The first issue concerns the relationship between access and reportability. F&L write that we 'propose that consciousness is inextricably tied to one's ability to report about the contents of an experience'. Their criticism seems to rest on the belief that we claim that consciousness is tied to the ability to do things such as talk or press a button. This is not our view. If it were, it would clearly be wrong: information can be conscious yet verbally unreportable. Some patients with locked-in syndrome or who are in a persistent vegeta-

tive state have been identified as conscious even though they cannot talk about their experiences. However, it must be stressed that these patients do still report their experiences by engaging in mental-imagery tasks during functional magnetic resonance imaging (fMRI) and it is these 'reports' that allow clinicians to identify these patients as conscious [3–5]. What enables the willful modulation of mental imagery? The mechanisms of access: attention, memory, decision-making, and so on. Without these mechanisms, a patient could not hold the instructions in memory, attend to the words being spoken over the sounds of the scanner and decide to imagine the stimuli that correspond with a pre-designated answer. Without these mechanisms, there would be no reason to believe that these patients are conscious of anything at all.

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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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