

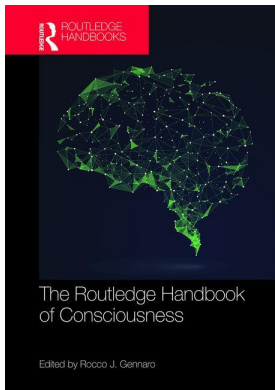
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### Consciousness and Attention

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# 18

## CONSCIOUSNESS AND ATTENTION

*Wayne Wu*

### 1 Introduction

This review will summarize work relevant to four questions

- 1 Is attention necessary for consciousness?
- 2 Is attention sufficient for consciousness?
- 3 Does attention alter the character of consciousness?
- 4 How does attention give us access to consciousness?

Remember that when we say that attention is necessary for consciousness, we mean that if a subject *S* is not attending to *X*, then *S* is not conscious of *X*, or equivalently, *S*'s being conscious of *X* implies (requires) that *S* is attending to *X*. When we say that attention is sufficient for consciousness, we mean that if the subject attends to *X*, this implies that the subject is conscious of *X*. Attention is enough for consciousness. The relevant senses of “attention” and “consciousness” will now be specified.

### 2 What Is Attention? What Is Consciousness?

A challenge to assessing our questions is to fix what attention and consciousness are. After all, it is difficult to talk clearly about how the two are related if the relata are unclear. Let us begin with attention, which has been actively studied in cognitive science but has only recently become a topic of philosophical research (on philosophical theories, see Mole 2013; Wu 2014). One thing is apparent in looking at the empirical literature on attention: there seems to be a lack of consensus on what it is. Thus, psychologists bemoan the absence of a uniform account of attention. Here is a representative quote:

In general, despite the ingenuity and subtlety of much of the experimental literature that has been devoted to these two enduring controversies [early versus late selection and automaticity and control in processing], the key concepts (selection, automaticity, attention, capacity, etc.) have remained hopelessly ill-defined and/or subject to divergent interpretations. Little wonder that these controversies have remained unresolved.

*(Allport 1993: 118)*

For current purposes, it will be enough to provide a sufficient condition for attention that is widely accepted in the empirical literature: if a subject *S* perceptually selects *X* to perform a task *T*, then the subject is perceptually attending to *X*. The rationale for this proposal is that it is assumed in designing experiments on attention. When one wishes to study attention, say visual attention to a moving object, one needs to ensure that during the study, subjects are attending to the targeted object. To ensure this, experimenters design a task where it is a necessary condition on performing the task correctly that the subject perceptually selects a target, or information from it, to guide task performance. If the task is designed correctly, then proper task performance entails appropriate perceptual selection and thus, appropriate perceptual attention. For current purposes, we can understand this sufficient condition as identifying the forms of attention of primary interest in cognitive science (this is not a surprise given that it is assumed in experimental design). A broader characterization of attention expands from focusing on common experimental tasks to actions. If we expand the sufficient condition to encompass all action and endorse the necessary condition, we have the following definition of attention: attention to *X* just is selection of *X* for action. Nevertheless, for current discussion, we need only the sufficient condition.

What of consciousness? Ned Block (Block 1995) distinguished between *access* and *phenomenal* consciousness. Access consciousness, at root, concerns the use of information by the subject. Intuitively, to be access conscious of *X* is to be able to use *X* in some way. Indeed, attention, as given in our sufficient condition, embodies access for action. Block himself spoke of access for the sake of *rational* control of action, thus limiting the type of informational access that qualified as conscious in the relevant sense.

Our focus, however, will be on phenomenal consciousness, but as scientists have noted, this notion is not well-defined. A salient attempt at a definition was given by Thomas Nagel, when he suggested that a state is (phenomenally) conscious if and only if there is something it is like for the subject to be in that state. The problem is that the definition is no more illuminating than the elusive notion of “what it is like” for the subject. As a scientist might complain, how does one “operationalize” that definition to allow it to guide empirical study of consciousness?

Empirical work, however, can proceed so long as one can track the phenomenon in question. At this point, philosophers and sympathetic scientists will rely on introspection: one can track consciousness because one can access what it is like for one in experience, and this access is just *introspection*. So, we can assess claims about the relation between consciousness and attention by drawing on introspection to track consciousness and the empirical sufficient condition to fix when attention is present and, with some additional assumptions, when attention is absent.

One important distinction that we will largely ignore concerns the different targets of attention, as in the visual case when we speak about attention to objects, spatial locations or features. This introduces important distinctions that any complete analysis of the relation between attention and consciousness must confront, but we shall focus on their interrelations at a more abstract level of analysis, namely in terms of selecting targets for tasks and whether such selection is necessary and/or sufficient for consciousness.

### 3 Is Attention Sufficient for Consciousness?

One central issue in the empirical literature concerns whether attention and consciousness are the same process (Koch and Tsuchiya 2007). The identity is false if one can occur without the other, so we can investigate whether there can be selection for task without phenomenal consciousness and vice versa. The empirical sufficient condition allows us to draw on experimental paradigms to *test* whether attention and consciousness are tightly correlated. For example, if

we can demonstrate that subjects are attending using a concrete attentional paradigm where selection for task is operative, and yet show that subjects are not conscious, then we will have shown a case where attention to *X* is *not* sufficient for consciousness of *X*. It then follows that attention and consciousness are not the same.

Are there counterexamples to the sufficiency of attention for consciousness? Blindsight patients provide a possible instance. These subjects have damage to primary visual cortex leading to hemianopia in the contralateral visual field, namely a blind field. They report not being able to see stimuli in that portion of the visual field, but strikingly, when forced to guess about stimulus properties in that blindfield, their perceptual reports show above chance accuracy (Weiskrantz 1986). Hence, they exhibit visually guided response in an area of purported blindness, hence blindsight. This ability is likely mediated by subcortical visual pathways that reengage cortical vision in a way that supports the observed perceptual discrimination behavior (Schmid and Maier 2015). While questions have been raised as to whether cases like blindsight present *phenomenal* blindness (Phillips 2016), let us assume with most theorists that blindsighters are phenomenally blind in the relevant part of the visual field. Can we then show that they can attend to the objects within the blind field?

Given the sufficient condition, we need to locate a task where appropriate task performance requires selection of, and hence attention to, *X*. One standard paradigm is spatial cueing (Posner 1980). In a standard version, a subject is asked to detect visual targets that are flashed on the screen peripheral to the point of fixation, the point on which subjects must keep their eyes fixed. During the task, the subject maintains fixation while attempting to detect targets that appear in the periphery. During the interstimulus interval period before the flashing of the target, a cue will appear, either a central (symbolic) cue at the point of fixation such as an arrow pointing to a peripheral location or a peripheral cue that occurs at the possible target location. Cues can be valid or invalid, that is, they can appear where the target subsequently appears (valid) or does not appear (invalid). During an experiment, the ratio of valid/invalid cues is often in the range of 80/20, so cues carry information about the location of the target (for a discussion of other psychological paradigms, see Wu (2014, ch. 1)).

Where attention is engaged, a standard observation is that relative to a neutral condition, valid cues lead to faster response times and/or greater accuracy, while invalid cues lead to slower response times and/or greater inaccuracy. If visual attention were a spotlight, the idea would be that valid cues draw the spotlight to the location of a future target facilitating target detection while invalid cues draw the spotlight away, leading to decrements in performance, say slower reaction times, due to having to reset the spotlight (such metaphors like the spotlight should be taken with many grains of salt). Thus, increases in reaction time and/or accuracy *during performance of target detection in this paradigm* are a signature of visual spatial attention. This provides a case of selection for task that we can use to fix the deployment of attention.

We can now combine spatial cueing with blindsight: Do blindsighters show spatial cueing effects of the sort associated with spatial attention? Bob Kentridge and colleagues demonstrated this with the blindsight patient GY who showed spatial cueing effects to targets in his blindfield (Kentridge et al. 1999). Later work reproduced similar results with normal subjects by inducing blindsight-like responses using techniques such as visual masking which makes targets “invisible” (Kentridge 2011). The results seemingly demonstrate cases where attention and consciousness come apart, namely where attention to a location is not sufficient to induce consciousness.

Earlier, I noted that we should keep track of the “kind” of attention at issue, and in the visual domain, whether attention is directed to locations, features or objects. Those distinctions are relevant since the previous paradigm is typically understood as a test of *spatial* attention, yet blindsight in the first case is the claim that subjects do not consciously perceive the stimuli whose features

they can reliably report when forced to guess. That is, blindsight concerns object or feature perception. Thus, one can argue that the case of spatial cueing in blindsight does not provide a counterexample to the claim that if one is attending to an object, one is conscious of that object (Prinz 2011). After all, we have *spatial* attention and failure of *object* consciousness. However, recall that the task is a target detection task that is facilitated by a cue, so attention to objects is plausibly present. How else could the subjects make the appropriate report? So, blindsight does provide a case of object attention (detection of targets) along with blindness to those objects (for a demonstration of an object attention effect in blindsight patients, see Norman et al. 2013).

Does this mean that attention never gives rise to consciousness? That is a trickier claim to assess. We will consider two cases. The first is whether attention can alter consciousness, say when one shifts spatial attention thereby causing changes in conscious experience. We will consider that possibility in Section 5. The other case is the claim that attention makes consciousness possible. This idea can be unpacked in light of the claim that attention is necessary for consciousness, such that when one is not attending to a stimulus, one is thereby not conscious of it. If attention is like a gate, then perhaps when one then shifts attention to the stimulus one is conscious of it. If the latter claim is true, then in that context, attention can be sufficient for consciousness by making it come on the scene.

#### 4 Is Attention Necessary for Consciousness?

Call the claim that attention is necessary the *Gatekeeping Thesis*:

**Gatekeeping:** one is perceptually conscious of X only if one perceptually attends to X.  
(where perception is in the same modality)

Why think that this thesis is true? It might seem that consciousness and attention are tightly yoked because to report on (introspect) consciousness, we need to attend.

Is there evidence for Gatekeeping? It is widely thought that a wealth of empirical evidence supports it. Given that Gatekeeping expresses a necessary condition, there is a clear prediction: if we can find a context where attention to X can be or is disrupted, then consciousness of X can be or is disrupted. For example, if one can manipulate attention by pulling it away from X, one will thereby eliminate consciousness of X if attention gates consciousness. This would lead to *inattentive blindness*. Let us consider two putative sources of empirical evidence.

The first case involves paradigms where subjects are asked to do an attentionally demanding task that is directed at Y in the presence of X where  $Y \neq X$ . The idea is that given the widespread view that attention is capacity limited (you can't attend to *everything*), an appropriately demanding task directed at Y will remove the possibility of attending to X. In effect, task demands distract the subject away from X. A famous example is an experiment conducted by Daniel Simons and co-workers, where they presented subjects with a video of two groups of players, one group dressed in white shirts, the other in black shirts, each group passing a basketball amongst themselves. Subjects were tasked with counting the number of passes by the white shirted players (notice that this invokes the empirical sufficient condition to direct attention to the ball by making it task relevant). At a certain point, a person dressed in a gorilla suit walks through the scene, turns and pounds its chest, and walks off. About 50% of subjects fail to notice the gorilla, i.e. do not report the gorilla's presence (Simons and Chabris 1999). Here, it seems that without attention to the gorilla, subjects are not conscious of the gorilla.

A second case involves neuropsychological patients. Subjects who suffer strokes, often in parietal cortex, can acquire hemispatial neglect. There are many ways of testing for neglect, but

the basic symptom is that subjects seem to be unaware of the side of space contralateral to the brain lesion (typically right-side lesions lead to the neglect of the left side of space). Strikingly, patients with left hemispatial neglect fail to eat food on the left side of their dinner plate or fail to detect objects on the left side of a sheet of paper. It then seems that subjects are strikingly unconscious of items to their left. Neglect is thought to be due to an inability to attend to the relevant side of visual space (Corbetta and Shulman 2011), so again, neglect suggests failures of consciousness linked to the absence of attention.

Theorists conclude that both cases exemplify inattentive blindness, but let us spell out the reasoning. Recall that we need to experimentally secure the absence of attention. In the gorilla experiment, this is achieved by manipulating attention to distract the subject away from the gorilla. So, inattention is achieved methodologically through task demands. In the case of neglect, inattention is a result of brain damage. Let us grant that attention to the relevant objects are missing in these two conditions. We must now establish that consciousness is absent. How? Here, we rely on introspective reports, or indeed their absence, as a sign of the conscious state of the individual. In the case of the gorilla, the relevant report that is absent is in fact a perceptual report: subjects fail to report the gorilla. Let us treat that failure as a surrogate of a plausible additional failure to introspect and detect a visual experience as being of a gorilla. Similar points arise for neglect patients who fail to report stimuli present in the neglected part of their conscious field. We could further probe subjects as to whether they are aware of anything beyond the items they report (as was done in Mack and Rock 1998), and perhaps subjects will explicitly deny being aware of anything out of the ordinary. Given a failure to generate reports of experiencing relevant stimuli or an explicit denial that anything odd is seen, we infer that subjects are not visually aware of the relevant targets and hence are blind to them. So, we have inattention and blindness, and it might then seem plausible that inattention explains the blindness, namely that it is because we remove attention that blindness results. Attention then would be necessary for visual consciousness.

In the visual case, Gatekeeping can be understood as holding that (spatial) attention defines the extent of the conscious visual field, so that objects that are not in the area targeted by spatial attention are effectively outside the visual field. In that sense, they could just as well be located behind the head even though they are right before the eyes. In the gorilla experiment, while the subject is doing the task and is not attending to the gorilla, the subject is blind to the gorilla. This blindness is temporary in that when one directs the subject's attention to the gorilla, the subject immediately recognizes it. In effect, such shifts of attention to the gorilla will bring the gorilla within the conscious visual field, thus making the gorilla an object of visual awareness. So, in this context, attending to the gorilla is sufficient for consciousness of the gorilla.

Does the evidence noted earlier support the Gatekeeping Thesis? The standard inference from data provided by inattentive blindness experiments and by spatial neglect do not support the Gatekeeping Thesis despite widespread assumptions that they do. Theorists have failed to notice this because they have failed to be clear about what attention is. Recall that we take attention to be selection for task, so in the case of the gorilla, selection for task is directed towards the basketball. The basketball, as the task relevant object, is the object of attention. To test Gatekeeping, we must insure the absence of attention to the gorilla, so if that condition is satisfied, the subject is not attending to the gorilla. The question then emerges: *Why should the subject report the gorilla if the subject isn't attending to it?* To report on an X, one needs to attend to it, to select it to guide report capacities. If I ask you to name the objects in a picture, you will scan each one, and when your eyes lock on, you are then in a position to report the object. Without that perceptual selection, there is no reason for an object to prompt a response. Thus, the very methodology used to demonstrate inattentive blindness undercuts the proposed result, for to

test Gatekeeping, the subject must not attend to the gorilla, but that condition *guarantees* that the subject will not report the gorilla since the necessary selective capacity for report is *distracted*. So, the experimental design ensures the failure to report or the design fails because the gorilla does capture attention. In fact, those are the observed results, and they are *consistent* with the subject being consciously aware of the gorilla. In other words, the experimentally imposed distraction is sufficient to explain failure to report in subjects whose attention is not captured by the gorilla.

The same point holds for those individuals suffering from hemispatial neglect: a neurological basis for failure of attention also insures that one cannot deploy the needed capacities for reporting objects. Indeed, if one observes the pattern of a neglect patient's eye movements across a picture where some item X is located in the neglected side of space (e.g. the left side of the picture), one will notice that the eye effectively never crosses the midline of the picture as defined by the body midline (Karnath 2015). Indeed, if one observes the posture of neglect patients, their head is always oriented away from the neglected side of space. So, in a clear sense, the neglect patient never looks over to the side of space where X is and a fortiori, never looks at X (fixes eyes on it). So, overt attention is never directed at X and if overt attention follows covert attention, then the subject never attends to the neglected side of space. Is it any wonder that one will not report X? The failure to look at and attend to X is sufficient to explain the failure to report even if the subject is conscious of X.

There is then a general problem for assessing Gatekeeping, since the relevant experiment apparently cannot be done. A crucial component in the experimental strategy is eliminating a form of attention to assess effects on consciousness. The problem is that in lieu of an adequate definition of consciousness, we empirically track consciousness by attention in introspection, so the experiment undercuts the possibility of tracking consciousness or its absence. This does not show that Gatekeeping is false, but it does undercut a wealth of empirical evidence that is thought to support the position.

Let us then consider the alternative to Gatekeeping, namely *Overflow*:

***Overflow***: a subject can be conscious of X without attending to X.

(Block 2007)

Can we empirically demonstrate Overflow? Again, we confront limits set by attention: we must determine that the subject is conscious of X despite having attention directed away from X. Yet as before, we track consciousness by introspective attention. This means that to test Overflow, we must induce conditions where attention is not directed to X thereby undercutting the very access we need to track consciousness. It seems that given the central role attention plays in introspection, we are not in a position to empirically assess either Gatekeeping or Overflow. Some think that Overflow is thus untestable (Cohen and Dennett 2011), but as we have seen, the same problem accrues to Gatekeeping.

Clarity on these issues requires clarity on the concept of attention. Let me note a recent study that is claimed to demonstrate that consciousness overflows attention. Christof Koch and co-workers have done experiments that they argue demonstrates consciousness in the "near absence" of attention (Li et al. 2002). Such a thesis would not, of course, demonstrate the falsity of Gatekeeping though it raises a host of important issues. Can there be different amounts of attention? If a Gatekeeping Thesis is reformulated to consider different amounts of attention, does that mean there will be different amounts of consciousness? What would talk of different amounts of consciousness mean? Clearly, some further conceptual work is needed to clarify these issues.

It might seem obvious that there can be more or less attention, but what precisely does that mean? It would be good in this domain to not rely on intuitions but draw on analyses that are



as precise as possible, and in the case of attention, we draw on the empirical sufficient condition. In that case, there is one clear notion of amount of attention that we can formulate at the outset, namely the amount of selection for action with respect to the targets of attention within a specific task context. For example, if one is dealing with many objects as opposed to a few, then the amount of attention can be fixed by the number of objects selected, and here there are clear limits to the number of objects subjects can attend to. With such specifications in place, we can then deal with claims about consciousness in the “near absence” of attention. On quantity of attention, it is up to researchers to specify what the relevant measurement is. That said, the critical question addressed by our formulation of Gatekeeping is whether the loss of attention results in the loss of consciousness, so on that point, near absence of attention is not sufficient to address the issue with which we began. Yet in every case, we face the original problem: the assessment of consciousness requires attention, and to the extent that subjects report that they are aware of objects “outside of attention” through their behavior, that behavior itself implicates attention and undercuts the core claim.

These are troubling results in that we seem to be unable to empirically support Overflow or Gatekeeping. Still, there might be reasons to query the severity of Gatekeeping, since it implies blindness without attention in the visual case. Blindness must be the absence of visual consciousness, but this seems both odd and severe. If a gorilla is standing behind you, then you are in a clear sense blind to it in that you have no visual experience of it. Now, as the gorilla walks around to come before your eyes, imagine that your attention is fully locked onto some other object so that no attention is directed at the gorilla. Is it plausible that the gorilla is phenomenally absent as when it was standing behind you? Let us imagine that you attend to the gorilla momentarily but ignore it (you know it is your friend dressed up as a gorilla and expect him to be moving about). Your shifting attention to it brings it into consciousness, but now you go back to attending to other matters. Does the gorilla somehow literally disappear before your very eyes, a *phenomenal hole* in the fabric of the visual field?

The idea that attention leads to blindness seems severe given that there is an alternative that seems plausible. When attention is removed from the gorilla, the gorilla does not disappear but becomes less in focus. A similar effect is achieved when you foveate the gorilla and then saccade to another object, putting the gorilla in peripheral vision, where it appears like an indistinct black blob. At that point, the gorilla remains in consciousness but no longer appears as a gorilla but rather as a black shape. The idea then is that attention puts things, metaphorically, in focus. Again, we are not in a position to establish what we might call *inattentional agnosia* or perhaps *inattentional blurriness* since that would require attention. Yet, this picture has what seems like an advantage, that the issue is not the absence of consciousness in the absence of attention but the absence of typical clarity that attention brings. Put another way, a middle ground position is to acknowledge that attention changes the character of consciousness without gating it.

## 5 Does Attention Affect Consciousness?

Well, certainly. The idea bruited in the last section is that attention “puts things in focus.” We can put this slightly more precisely by saying that attention sharpens representations, something that we will unpack in a moment. Let us first consider a case where shifts of attention do seem to change consciousness. Figure 18.1 is an illusion discovered by Peter Tse (redrawn based on Tse 2005):

Maintain fixation on any of the dots but shift attention between disks. Notice anything different about how the disks appear to you? To many people, the attended disk looks darker than the unattended disks.



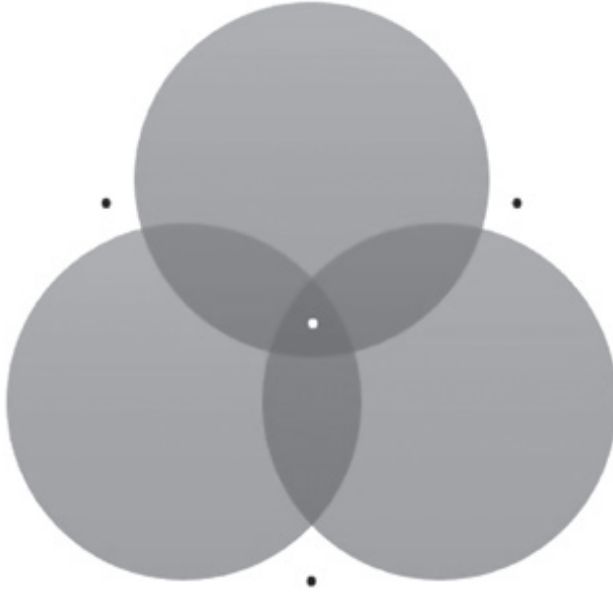


Figure 18.1 Illusion by Peter Tse (adapted from Tse 2005)

The common idea of an attentional spotlight as a characterization of attention suggests that one effect of attending to X is altering the representations of X. For example, it might intuitively seem that when we attend to X, say in vision, we have a clearer view of it. Attention changes the quality of perception. We must be careful with introspection, however, for in the visual case, clarity of vision depends on fixating the item of interest so that it stimulates the fovea, the area of the retina that provides for the highest spatial acuity. While cognitive scientists take moving the eye to foveate objects to count as *overt* attention, it is not clear that foveation should be equated with attention since one can pay attention “out of the corner of one’s eye” while maintaining focus on an object at the center of one’s visual field.

At the neural level, attending to objects is associated with a variety of neural responses that seem to suggest changes in representation. For example, visual attention can increase the strength of neural signaling (gain modulation), sharpen selection as when neural spatial fields contract around targeted objects, or sharpen contrast representations (contrast gain). Do these neural effects have upshots in visual consciousness? Work by Marisa Carrasco has probed this possibility (Carrasco et al. 2004). Carrasco and co-workers asked subjects to detect the orientation of Gabor patches, i.e. luminance contrast gradients. In one experiment, subjects maintained fixation on a central cross while they reported on the orientation of a targeted Gabor which could be tilted either to the left or the right. Two Gabors were presented at the periphery, one to the left of fixation, the other to the right. The target was defined as “the Gabor that appeared of the highest contrast.” In this way, the subjects had to perform two tasks, discriminating which of two possible targets had the higher contrast appearance relative to the other, and then, reporting the orientation of that target. In effect, the first task probes how the Gabor’s appeared to the subject. The additional factor in the experiment was to use spatial cueing to direct attention to one of the two Gabor patches. Carrasco provided evidence that when attention was deployed to a Gabor, the contrast appeared to increase. This suggests that attention can alter conscious appearances perhaps by altering underlying neural properties (for counterarguments, see Schneider and

Komlos (2011)). Carrasco's group has demonstrated similar effects for size and color (Fuller and Carrasco 2006; Gobell and Carrasco 2005).

There are limits to attention's effects, as can be seen in the phenomenon of visual crowding (Whitney and Levi 2011). Visual crowding can be demonstrated in the following display:

$$+ \quad \quad \quad \mathbf{X}$$

$$+ \quad \quad \quad \mathbf{AXA}$$

Fix your eyes on the “+” and try to attend the “X” in the periphery. In the first line, you can still make out the “X.” In the second line, you cannot since the “A”s that flank the “X” crowd it. The current views about crowding conceive of the flankers as disrupting feature integration and it is plausible that when the visual system fails to integrate features, it fails to construct a coherent representation of objects (Whitney and Levi 2011). One might then think that the necessary neural object representations will not form and thus, that we should not be able to see objects in conditions of crowding. Indeed, in many natural scenes, crowding in the periphery occurs given the natural clutter of our environment. Think of walking through a park or reading a text. Crowding identifies a fundamental limit on visual representation, but it is also resistant to attention (Intriligator and Cavanagh 2001). It is not clear that attention can even dissect the crowded letter but even spatial attention to the area of crowding cannot lead to an escape from it.

## 6 Attention and Introspection?

We began our discussion by noting that we do not need to define consciousness to study it. We just need a way to track it. This tracking capacity is provided by introspection, which deploys a type of attention or focus on the properties of consciousness. Yet how does attention work in introspection?

One possibility raised by the last section is that in attending to consciousness, we might thereby change its character. That is “observation” of conscious states changes the very state observed (again note the Carrasco results discussed earlier; this possibility was noted early on by Hill (1991)). One question then would be whether introspective attention could give us an undistorted view of consciousness. But set aside that concern and focus on a pressing question: what exactly is introspection?

A common idea is that of inner focus: when we introspect our conscious experiences, it is as if we turn our attention inwards to an internal feature of our minds. For example, Brie Gertler writes:

By focusing your attention on the phenomenal quality of [a sensation], you can come to know something about your current experience. Philosophers generally agree on this much.

*(Gertler 2012)*

Putting a different spin on the idea, William Lycan writes:

When we attend to our own mental states, it feels like that is just what we are doing: focusing our internal attention on something that is there for us to discern.

*(Lycan 2003)*

The problem is that philosophers do not typically say more in terms of the psychological details of what introspection is as a psychological capacity. What would it be to have this capacity?

What is the form of attention referred to here? The challenge is to say something about this capacity that helps us understand consciousness itself.

In recent years, some philosophers have pressed the question concerning introspective reliability (Schwitzgebel 2011) leading to a skepticism about introspection of consciousness. Others have suggested that introspection does not provide a fruitful method in the empirical investigation of experience (Irvine 2012). In response, philosophers have attempted to calibrate attention (Bayne and Spener 2010; Spener 2015). What remains missing is a psychologically realistic account of what introspective attention involves. When such an account is provided, we can then put ourselves in a better position to understand introspective attention and hopefully, thereby understand when introspection is reliable and when it is not.

Lycan, as we saw, clearly thinks that when we introspect on how introspection of consciousness works, it appears that introspection of consciousness involves a form of internal attention. We can literally focus on our internal states. Still, not everyone finds this when they introspect. Thus, Harman writes:

When Eloise sees a tree before her, the colors she experiences are all experienced as features of the tree and its surroundings. None of them are experienced as intrinsic features of her experience. Nor does she experience any features of anything as intrinsic features of her experiences. And that is true of you too. There is nothing special about Eloise's visual experience. When you see a tree, you do not experience any features as intrinsic features of your experience. Look at a tree and try to turn your attention to intrinsic features of your visual experience. I predict you will find that the only features there to turn your attention to will be features of the presented tree.

(Harman 1990: 667)

Harman's point is that when we attend in introspecting, our attention does not seem to be internally directed but rather points outward to the world. Such *transparency* accounts of introspection have been developed where there is no internally directed introspective capacity (Dretske 1995). The distinction of how attention is deployed in introspection divides between two conceptions of consciousness. On one, the phenomenal is in a sense external, so that in focusing on the qualitative aspects of conscious experience, our attention is directed outwards. On the other, the phenomenal is in a sense internal, so that in focusing on consciousness, attention is directed inwards.

The point is that our conception of how we access consciousness is not independent of our conception of what consciousness is or consists of. We might have hoped for a more neutral yet substantive characterization of introspection, beyond the common invocation of attention to consciousness. Yet, the conception of attention as deployed in introspection is divided by a border that also divides metaphysical views about consciousness. In that sense, introspection is no less controversial than consciousness. This opens up the possibility that investigation into the nature of introspection might have a role to play in helping us assess theories of consciousness.

## 7 Conclusion?

There is no doubt that attention has an intimate relation to consciousness. Attention provides for our distinctive access to consciousness, and when it is disrupted, so is our ability to introspect what consciousness is like. At the same time, attention guides our actions, which are often influenced and controlled by what we perceive, and in that link, it can exert its influence, perhaps bringing items to awareness, changing how we experience them, all within the limits and parameters that are fixed by our brains.

We have learned much about attention in recent years, and deploying and modulating attention has played a central role in casting light on consciousness. Nevertheless, there remain a variety of questions of which we shall emphasize three:

- 1 Can we find an experimental way to assess the debate between Overflow and Gatekeeping, namely whether attention is necessary for some aspect of consciousness?
- 2 How precisely does attention affect the character of consciousness?
- 3 How does attention control our access to consciousness in introspection?

These questions have both an empirical and philosophical character, and the issue of the relation between attention and consciousness offers an opportunity for genuine interdisciplinary work involving cognitive science and philosophy.

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## Related Topics

- Materialism
- The Intermediate Level Theory of Consciousness
- The Attention Schema Theory of Consciousness
- Consciousness and Psychopathology