Christopher Mole

Attention and Consciousness

Abstract: *According to commonsense psychology, one is conscious of everything that one pays attention to, but one does not pay attention to all the things that one is conscious of. Recent lines of research purport to show that commonsense is mistaken on both of these points: Mack and Rock (1998) tell us that attention is necessary for consciousness, while Kentridge and Heywood (2001) claim that consciousness is not necessary for attention. If these lines of research were successful they would have important implications regarding the prospects of using attention research to inform us about consciousness. The present essay shows that these lines of research are not successful, and that the commonsense picture of the relationship between attention and consciousness can be retained.*

1. Attention and Consciousness Studies

To the psychologist, equipped with ever more refined and precise tools for observing the brain, the philosopher's *a priori* reservations about the attempt to explain consciousness tend to sound like naïve nay-saying on a par with the historical denials of the possibility of accounting for organic self-replication, or for superlunary motion. To the philosopher, on the other hand, the psychologist's belief that he has the resources to explain every mental phenomenon sounds like hubris of a sort that adolescent disciplines are often prone to, especially when the latest technologies have equipped them with new apparatus. This mutual suspicion might have led to an unproductive dialectical standoff had the psychologists who wish to research consciousness not found ways to steer clear of philosophical controversy.

One way for the psychologist to avoid philosophical controversy is to give up on talking about the *explanation* of consciousness, or about

Correspondence: Christopher Mole, University College Dublin, School of Philosophy, Belfield, Dublin 4, Ireland. *Email: Christopher.Mole@ucd.ie*

Journal of Consciousness Studies, **15**, No. 4, 2008, pp. 86–104

its *causation,* and to adopt instead the vocabulary of the search for 'neural correlates'. Adopting the explanatorily unambitious approach of correlate hunting, or, at least, adopting that vocabulary when presenting one's results, enables a good deal of research into consciousness to bypass philosophical controversy. But as a strategy for philosophy avoidance correlate hunting is not wholly satisfactory.

It is unsatisfactory partly because it is not one hundred percent successful. The idea that there *are* neural correlates of consciousness is, as it should be, a philosophically contentious one (see Noë and Thompson, 2004). It is also unsatisfactory because the lack of explanatory ambitions suggested by correlate-talk often fails to reflect the very real explanatory ambitions of the researchers who employ it.

For the experimental psychologist who wishes to research consciousness while avoiding philosophical harassment, and whose ambitions extend beyond mere correlate hunting, other philosophy-avoidance strategies may be more appealing. One alternative, rather more oblique than the policy of correlate hunting but with an equally long history, is the strategy of avoiding mentioning consciousness altogether and of restricting oneself to claims about *attention*. Thirty years ago this seemed like a surreptitious tactic for keeping consciousness within the experimentalist's purview, even when it was considered too ephemeral a topic for 'hard-nosed' psychology. In a review article from 1980, for example, Alan Allport issued the following 'word of warning':

> The study of 'attention' began in phenomenology. 'Everyone knows what attention is', wrote William James in 1890. Ninety years later the word is still used, by otherwise hard-nosed information processing psychologists, as a code name for consciousness (Allport, 1980 p. 113).

More recently it has begun to seem as if this coded way of speaking about a phenomenon that had been thought too mysterious for scientific investigation might turn out to be vindicated as a working hypothesis for its study. Theories and findings that were originally produced in attention labs are now being applied to consciousness, and they are being applied by the 'hard-nosed' contemporaries of Allport whose work it was that set the agenda for much of the research that goes on under the rubric of 'attention'. Anne Treisman, whose Feature Integration Theory has been prominent in discussions of attention since it was first proposed in 1980 (Treisman and Gelade, 1980), suggests in some of her recent work that descendants of this theory of attention may provide part of the explanation for 'the bound, unitary, interpreted, personal view of the world of subjective

experience' (Treisman, 2003, p. 111). She goes on to suggest, tentatively, that the sort of explanation that such a theory provides 'should give us all the information there is about the conditions that create consciousness' (*op cit*). Michael Posner, whose work in the nineteen seventies pioneered the methods by which covert visual attention is studied, is less tentative. He has frequently suggested that the study of attention *is* the study of consciousness. In a 1994 article entitled 'Attention: The mechanisms of consciousness' he wrote that:

> an understanding of consciousness must rest on an appreciation of the brain networks that subserve attention, in much the same way as a scientific analysis of life without consideration of the structure of DNA would seem vacuous.

Perhaps as a result of growing dissatisfaction with the strategy of correlate hunting, there is an increased interest among psychologists in following Posner's approach of taking attention research as revealing something about the explanation of consciousness. There is, correspondingly, a hope that, as Treisman suggests, theories pertaining to attention can be turned into theories pertaining to consciousness. The popularity of such attempts at explanatory trading-up, despite occasional philosophical warnings against them (Hardcastle, 1997; Lamme, 2003) reflect a growing body of research that seems to show that there is a need to revise the commonsense conception according to which attention and consciousness are related but distinct phenomena.

In this paper I want to make some progress towards assessing the prospects of using attention research to illuminate consciousness. I shall do this by evaluating some of the evidence that has been thought to show that the commonsense picture of the attention/consciousness relationship is in need of serious revision. The conclusion will be a deflationary one. Commonsense will emerge more or less unscathed. The attempt to treat attention-research as providing a trouble-free road to theories of the neural basis of consciousness will look rather less enticing than it might have done previously.

2. Commonsense Treats Attention As Requiring Consciousness

In our everyday encounter with the mental we take the relationship between attention and consciousness to be a close one. We catch someone's attention as a way to influence what he is conscious of, and it is by introducing something into his field of consciousness that we catch his attention. Moreover, we expect the facts about what a person is attending to to make an immediate difference to what it's like to be

that person and we expect a person to be able to know what she is attending to in the immediate first-person, privileged-access, non-inferential way that characterizes knowledge of facts about consciousness.

The fact that we expect attention and consciousness to behave in these ways is made intelligible if we understand commonsense psychology to treat paying attention to something as a way of being conscious of that thing: a way that locates the thing attended in the foreground of experience. According to commonsense psychology, then, attention requires consciousness.

That's not to say that anything that one can pay attention to one must *first* be conscious of. That view would be incompatible with the familiar experience of finding that some things are not consciously registered until one has given them one's attention. The dust on the bookshelf, for example, seems to be something that one cannot notice unless one pays attention to it. Something similar may be true of the background hum from the electric lights, or the weight of one's everyday clothes, or the items in the periphery of the visual field. If we are not conscious of these things before we turn attention to them then it cannot be right to say that consciousness is a prerequisite of attention.

The extent to which such items do figure in consciousness when unattended is difficult to gauge. Eric Schwitzgebel's recent work (Schwitzgebel, 2007) provides a vivid illustration of the difficulties that are faced when trying to make an unprejudiced attempt to assess our consciousness of unattended things. One of the things that Schwitzgebel's work makes clear is that the commonsense notions of attention and consciousness allow considerable room for flexibility on this point. The subjects in Schwitzgebel's experiment were all competent users of the concepts 'attention' and 'consciousness' but they nonetheless take a range of views on the question of whether attended things were present to consciousness before they came to be attended. The commonsense view is that everything to which one pays attention is, necessarily, something of which one is conscious, not because commonsense is committed to the view that consciousness is a necessary *prerequisite* for attention, but because attending to something is treated by commonsense as a *way of* being conscious of it.

2.1. What this commonsense view entails

It follows from the claim that consciousness is necessary for attention that 'Jones is attending to x' entails that 'Jones is conscious of x', but the states we are dealing with here are paradigmatically intensional

ones and the usual care is needed to avoid intensional fallacies. Cases where the thing that Jones is attending to is a *B*, but where Jones is not aware of the fact *that* it is a *B*, are not counterexamples to the *de re* claim about the necessity of being conscious of the things to which one attends. That claim is consistent with the possibility of items that catch one's attention before one has formed any particular thought about what they are.

A special case of this is the case where Jones is attending to an object that has property ϕ, *and where it is on account of the object having* ϕ *that it captured his attention*, but where Jones is not aware of the fact that it has ϕ. Everyday observation and the performance of subjects in laboratory tasks suggest that such cases are fairly common. It is an everyday experience to find oneself having been drawn to a noise at the window without having thought about what it is. In such a case the features in virtue of which a thing catches our attention may not be among the features that we consciously register. Steven Yantis, in a footnoted remark in a paper from 1993, reports observations of experimental subjects who show this sort of ignorance of the features in virtue of which stimuli catch their attention (Yantis, 1993, p. 677). What Yantis found was that subjects in visual search tasks show a speeded response when the thing they are searching for onsets more suddenly than the distractor items, and that they show this effect even though they seem not to be aware of the fact that any of the stimuli onset suddenly. Sudden onset seems to be the feature in virtue of which the target items come to be attended, but, although the subjects are aware of these items, they are not aware of them having the property of suddenly onsetting.

Something similar may be going on in the following case, raised by an anonymous referee for this journal. A baby's cry will waken a mother more readily than equivalent noises. If the sleeping mother is not conscious of the cry, and if the selectivity demonstrated in the cry's waking her involves attention, then the case poses a serious problem for my claim that consciousness is necessary for attention. Since the case is an everyday one, the objection is not only to the claim about the necessity of consciousness for attention, but also to my attribution of that claim to the commonsense picture of the mind.

Some cases of selective waking to a baby's cry may be examples of the phenomenon observed by Yantis. They may be examples in which the half-waking mother *does* have a conscious state in which the thing represented is the baby's cry, but where (since the consciousness is of a vague half-waking sort) she is not (yet) aware of the fact that it is a cry, even though that is the feature on account of which the cry is

attention-capturing. If that is the right interpretation of the case then it is not a case in which the mother attends to the cry while not being conscious of it, and so it is not a counterexample to the claim about necessity.

I am inclined to think, however, that the right way to defuse this potential counterexample is not to show that the sleeping mother is a little bit conscious of the cry after all, but to show that the case is not a case of attention. An informal pencil and paper survey suggests that this verdict accords with that given by commonsense psychology. Sixteen women (none of them with philosophical or psychological training) were recruited in campus cafés and asked which of four descriptions seemed to be the most natural account of the fact that a baby's cry will wake a mother more readily than other sounds. Only one of the women surveyed thought it was natural to describe the phenomenon as 'The cry wakes the sleeping mother because, although she is not conscious of the cry, she does pay attention to it.' That one woman thought it would *also* be natural to describe the mother as both attending and conscious. Twelve of those surveyed thought that it was natural to describe the case as 'The cry wakes the sleeping mother because, although she is not paying attention, she is conscious of it.' Six thought it natural to describe the case as 'The cry wakes the sleeping mother because she is conscious of it and pays attention to it'. (These results are given in table 1.)

		The mother is conscious of the cry	
		Yes	No
The mother is paying attention to the cry	Yes	6	1
	No	12	0

Table 1.

Subjects were told: 'A mother can be woken up by the sound of her baby crying, but will sleep through similar noises. Which of the following do you think is a natural description of this?' Multiple answers were permitted. The four options were presented in randomized order.

The case of the baby's cry only provides a counterexample to the claim that consciousness is necessary for attention if the phenomenon does involve attention but does not involve consciousness. The commonsense verdict in this case is that it *does* involve consciousness (18 out of 19 responses) and that it does *not* involve attention (12 out

of 19). Only one respondent found it natural to describe the case in the way that would make it problematic for the necessity claim.

There are problematic interpretations of the case of the baby's cry, but they are unpopular with the commonsense thinkers who participated in my survey. The claim that consciousness is necessary for attention, when properly understood, does not entail that consciousness of x always precedes awareness of x, nor that one must be conscious of the fact that α is P in order for P to be relevant to the fact that α catches one's attention. When properly understood the claim does seem to be a plausible principle of commonsense psychology.

2.2. Commonsense treats some forms of consciousness as requiring attention

That consciousness is necessary for attention is not all that commonsense has to say about the attention/consciousness relation. In the sorts of explanations that it gives for our successes and failures, the commonsense position seems to be, not only that conscious is necessary for attention, but also that there are lots of situations in which attention to a thing is necessary for conscious awareness of that thing. Drivers who don't pay attention to other traffic are sometimes dangerous, partly because their inattention tends to mean that they aren't conscious of unexpected hazards until it's too late to do anything about them. Children who don't pay attention in school are unlikely to learn very much, partly because their inattention tends to mean that they aren't conscious of their teacher's explanations. According to commonsense psychology, then, in addition to consciousness being necessary for attention, there are also some cases in which attention is necessary for consciousness. It seems, in particular, that attention is necessary for consciousness of very small or very unexpected changes, and that it's necessary for fully-functioning, cognitively-useful consciousness of the sort that can provide one with knowledge, that can enable one to respond appropriately to out of the ordinary driving conditions, and that can put one in a position to learn from a teacher's explanations.[1]

[1] Block's seminal 1995 article encouraged us to distinguish the consciousness that puts one in a position to answer questions and make controlled actions (A-consciousness), from the consciousness that is the having of a phenomenal experience (P-consciousness). We shall be considering experiences of objects that fail to put one in a position to answer certain questions about those objects, and will, to that extent be following Block in taking these two concepts of consciousness to be separable, but, for reasons that should become clear, we shall be taking such cases to be instances in which what's lacking is a certain form of *attention*, and not a certain form of *consciousness*.

3. Is Attention *Always* Necessary for Consciousness?

If attention and consciousness necessitated one another then they would be co-extensive and psychological studies of attention would provide us with a wealth of information about consciousness. But the trading-up of findings about attention to findings about consciousness is only warranted if consciousness is necessary for attention *and attention is necessary for consciousness*. This goes beyond the commonsense view, according to which attention is only *sometimes* necessary for consciousness.

Since Arian Mack and Irwin Rock's 1998 book *Inattentional Blindness* (enthusiastically discussed in the *Journal of Consciousness Studies*, Vol. 9, no. 5–6) psychologists have been increasingly confident that it will turn out that everything that one is conscious of is a thing to which one is attending. If that is so then commonsense needs to be revised in precisely the way that would legitimate explanatory trading-up.

Mack and Rock claim 'that attention is necessary for conscious perception' (p. 250) and are quite clear that this is intended to entail a revision to the commonsense picture. They claim: 'our research brought to light some dramatic and surprising findings […] The single most important lesson is that there seems to be *no conscious perception without attention'* (p. ix. emphasis in original). It is very far from clear that the evidence they offer for this claim is compelling. The verdict of Schwitzgebel's recent work on this question is that Mack and Rock's arguments are 'badly question-begging'.

The task of assessing Mack and Rock's research is somewhat hampered by the misleading way in which they introduce their subject matter. Their book begins by stipulating, as a matter of definition, that:

> In this book the term 'attention' is used to refer to the process that brings a stimulus to consciousness. It is, in other words, the process that permits us to notice something. (p. 25)

But if this were allowed as a matter of definition then the book's conclusion ('our claim that attention is necessary for conscious perception'), so far from being the 'surprising and dramatic' result that was advertised, would be merely analytic. It would be analytic because it is a consequence of the definition of 'attention' as 'the process that brings a stimulus to consciousness' that whenever there is conscious perception there is an instance of attention, and hence it is a consequence of that definition that attention is necessary for conscious perception.

Although they define their terms in such a way as to make their conclusion look trivial, Mack and Rock do give a clear account of what they did and what they found. We can leave aside their problematic definitions and ask what these results actually show. Here's how Mack and Rock summarize their research paradigm:

> Observers were asked to report the longer arm of a cross […] The cross was presented on the screen of a computer for 200ms. […] In most cases, as soon as the cross disappeared, a pattern mask appeared for 1500msec. that covered the entire area of the visible screen. […] Before each presentation of the cross, a fixation mark was displayed at the centre of the screen and the subjects were asked to keep their eyes focussed on it until the mask appeared. When the mask disappeared, subjects reported which line of the cross seemed longer. […] on the third or fourth trial a critical stimulus was presented in a quadrant of the cross within 2.3 degrees of fixation. […] Immediately following the trial in which the critical stimulus was presented, the subjects were asked whether they had seen anything on the screen other than the cross figure. (Mack and Rock, 1998, p. 6)

Crucial to this experimental procedure is the fact that the 'critical stimuli' are presented for a fifth of a second and then masked. They are presented to subjects who aren't expecting them, who have very little practice with the task, and who are occupied with a different task, involving different stimuli. The result, which Mack and Rock describe as 'puzzling and surprising', is that 'on average 25% of the observers *failed* to detect their presence' (p. 13 emphasis original).

The commonsense picture of attention that was outlined above finds nothing here for Mack and Rock to be puzzled or surprised by. A prominent part of that picture (as we saw in the cases of the inattentive driver and the inattentive schoolboy) was that there are some circumstances in which attention is necessary for consciousness. It is neither surprising nor dramatic to learn that included among these circumstances are some but not all of the cases in which the stimulus is presented unexpectedly, for a fifth of second, concurrently with something else that one *is* attending to, in an unfamiliar experimental paradigm, and followed by a pattern mask.

Mack and Rock did make some surprising discoveries. It is perhaps surprising that people get worse, not better, when the 'critical stimulus' is presented in the very centre of their visual field (*ibid* pp. 68–9). It is certainly surprising, but not, I think, especially puzzling, that subjects in these conditions fail to notice frowny-faced icons but usually do notice smiley-faced ones (*ibid* pp. 140–5). It is also surprising that subjects fail to notice misspelt versions of their names, but do notice if

the name is spelt correctly (*ibid* pp. 120–3). But none of this shows, nor even very much suggests, that attention is necessary for consciousness. It shows only that whether or not one notices something is partly determined by the significance of the thing.

What Mack and Rock's work did succeed in doing was inspiring an enormous amount of subsequent research, some of which does a rather better job of being surprising, and much of which certainly succeeds in being memorable. It has become well-known, for example, that the appearance of a gorilla in a video of a basketball-type game is often not noticed (Simons and Chabris, 1999), although it is less well known that 42% percent of people *do* notice the gorilla, and that the number goes up markedly if the people watching are basketball experts, or if they're expecting something (Memmert, 2006). It's well known that large-scale but narratively insignificant changes to a picture are hard to spot when a flicker in the picture coincides with their appearance (Rensink, 2002). The extent of the difficulty is, however, easy to exaggerate. The difference in change blindness pictures do get spotted within a couple of seconds, or more rapidly than that if the changing feature is human face (Ro *et al*, 2001), and the effect goes away if there's no flicker.

There is, of course, an interpretation of these results that is consistent with the hypothesis that attention is necessary for consciousness. But that fact, by itself, does not give us any reason to believe the hypothesis is true, since, as several recent commentators have made clear, there are other hypotheses that can explain the data just as well.

One alternative hypothesis simply says that, although attention isn't *in general* necessary for consciousness, it is necessary *sometimes*, and the presence of a distracting flicker is one of those occasions on which it is necessary. Another hypothesis, discussed by Schwitzgebel, says that attention is not necessary for consciousness, but is necessary for consciousness not to be inchoate. The 'inattentional blindness' effects can be explained just as well if they are taken to be consequences of 'inattentional agnosia' (see Simons, 2000). A third possibility, developed in forthcoming work by Ned Block, is that inattention leads to a lack of *accessibility*, rather than a lack of consciousness.

What I want to show here is that an alternative interpretation of the change-blindness/inattentional blindness results, along the lines of those entertained by Schwitzgebel, Simons and Block, is not merely a rival explanatory hypothesis, but is more or less entailed by some relatively uncontroversial features of the epistemology of perception. According to this alternative hypothesis attention isn't necessary for

consciousness, but it is necessary if one's experience is to provide one with knowledge of the sort probed by the experimenter's questions in a change-blindness experiment.

Whatever one's view of the epistemology of perception, it is natural to think that one's experience of a changing picture doesn't put one in a position to answer the question 'Which thing is changing?' until one has formulated the structured thought: 'That thing is changing.'[2] Now, the formulation of a structured thought is conceptually demanding. It is conceptually demanding in the sense that formulating a thought with the form 'That thing is changing' requires one to deploy a concept of that thing, and to deploy a concept of changing. Until one has deployed concepts of those sorts, and thereby formulated a thought with the form 'That thing is changing', one can be having an experience of a changing thing without being in a position to answer questions about which of the things experienced is the changing thing.

If this picture of the role of concepts in the epistemology of perception is accurate then a subject in a standard change-blindness experiment is only in a position to answer the question 'Which thing is changing?' if he has deployed a concept that refers to the changing thing. It is plausible that, for normal subjects, the most readily available concept of the changing thing will be a *demonstrative* concept, and so that the subject will not be able to know which thing is changing unless he has a way of *demonstrating* the changing thing. This sort of demonstration of a thing seems to involve paying attention to it (a view developed in detail by Campbell, 2002). According to this story, then, the subject who has not attended to the changing item in the change-blindness pictures *does* have a conscious experience of it, but the experience does not have the structured content needed to provide the subject with knowledge of the fact that the thing is changing.

I do not claim that these considerations from the epistemology of perception entail the falsity of the interpretation of change-blindness effects according to which attention is necessary for consciousness. What they do show is that, in order for the hypothesis that attention is necessary for consciousness to be established, it will be necessary to rule out the story outlined above (according to which there is conscious awareness without attention, but it is only after attention is paid that this awareness gives one a conceptually structured representation of the sort that improves one's epistemic position *vis à vis* the stimuli in

[2] The reader who subscribes to the epistemological position presented by John McDowell (1996) and developed by Bill Brewer (1999) will regard the points in this paragraph as central to epistemology, but I do not think it is necessary to subscribe to that position in order to think that the points are true.

a change-blindness experiment). Our current ways of operationalizing attention and consciousness give us no way for doing this.

We lack a way of detecting that a subject is not attending, other than by gauging his lack consciousness. And we lack a way of gauging what the subject is conscious of, other than by gauging his knowledge. So long as we continue to operationalize attention and consciousness in the usual ways we will remain unable to adjudicate experimentally between the hypothesis that (1) unattended items are consciously experienced but are not epistemically useful until they have been 'brought into the space of reasons' by the (attention-involving) deployment of demonstrative concepts and (2) the hypothesis that unattended items are, *ipso facto*, not consciously experienced ones.

4. Is consciousness necessary for attention?[3]

We have been considering and rejecting some influential lines of evidence that purport to show that attention is necessary for consciousness. The idea that attention might be necessary for consciousness is an important one because if it is right then we might be able to reinterpret our research into attention so that it provides us with information about consciousness. But the claim that attention is necessary for consciousness only legitimates such explanatory trading-up if we keep hold of the claim, attributed to commonsense in section two, that consciousness is necessary for attention. We have seen that that claim, when properly understood, is an intuitively appealing one. It is surprising, then, to find that it too is rejected by Mack and Rock (who, for this reason, reject the explanatory trading up that treats the study of attention as a form of consciousness studies). They reject the claim that consciousness is necessary for attention, and reject the idea there is anything commonsensical about it:

> Unfortunately, although the proposal that conscious perception and attention refer to identical processes has the advantage of simplicity, it is discredited on several grounds. First, it would appear to lead to the false conclusion that there can be no attention without [conscious] perception. This conclusion seems false on both experiential and empirical grounds. (p. 245)

Were we too quick to claim that attention requires consciousness? The 'experiential and empirical grounds' that Mack and Rock take as showing that there can be attention without conscious perception

[3] I've had fruitful discussions about the topics in section four in several places. Thanks are due, in particular, to Jiaying Zhao and to members of the Irish Philosophical Club, and to Ned Block for very helpful discussions.

come from examples in which we want to say that the subject is paying attention although there is nothing for the subject to be perceiving. 'It is not an uncommon experience,' they write, 'to be looking for something, or keenly awaiting its appearance in the absence of perceiving it' (*op cit*). That's surely correct, but it doesn't make the point that they think it makes. The starting point for much mid-twentieth century research on attention was the thought that, although one can't attend to just any arbitrary absence, one can, for example, give full attention to a radar screen, waiting for a pip even when no pip comes (Broadbent, 1958). One can't do this for very many screens, and one can't do it for very long, but it surely is true that one can do it, and it surely is true that, in doing it, one attends to a screen on which there is nothing to perceive. Similarly, it's easy to create conditions in the lab for which it can be shown that the subject's attention is shifted to a place *before* anything has been presented there (Posner, 1980). Mack and Rock take cases like these to be cases in which there is attention without perception.

This is a mistake. Cases where one is on the look-out for something that doesn't happen are not cases of attention without perception: they are cases that *do* involve perception. It is *by perception* that the vigilant radar operator knows that no pip has occurred. The mistake here is a kind of quantifier-shift fallacy: It confuses the perception of absence with the absence of perception. In neither the everyday case nor the lab studies do we have subjects who show an absence of perception while attending. In both cases the subject is perceiving that nothing has yet occurred.

A somewhat similar distinction can be used to block another more sophisticated line of argument, also intended to show that, contrary to the commonsense picture, consciousness is not necessary for attention. This more sophisticated line of thought, which is owing to Kentridge, Heywood and Weiskrantz, attempts to show that consciousness is not necessary for attention by showing that there is attention to objects presented in the blind hemifield of blindsighters. Kentridge, Heywood and Weiskrantz's research has most often been discussed as telling us something about the nature of blindsight, but they are clear that the lesson they think should be drawn from these studies is a lesson about the relationship between attention and consciousness in the normal case. One paper by Kentridge and Heywood states that:

> the conclusions we draw from these studies do not apply solely to blindsight. […] We conclude that whilst the direction of attention

> towards a stimulus may be necessary if it is to reach awareness (Mack and Rock 1998), the engagement of neither attention nor alerting processes is sufficient for awareness. (Kentridge and Heywood, 2001)

The studies that led Kentridge, Heywood and Weiskrantz to conclude that their blindsighter shows attention to objects in the blind hemifield are studies of cases in which, as in many blindsight experiments, a series of auditory tones are played and the blindsighter (GY) is asked to make guesses about whether or not a circle has been presented along with those tones, in the blind half of his visual field. GY's performance in this task improves if the circle is presented in a location that has previously been indicated. This prior indication of the stimulus location can take various forms, each of which seems to succeed in cueing GY's attention. In one experiment the likely location of presentation was indicated by an arrow presented briefly at the point of fixation (and so within the subject's field of normal vision). In another experiment the cue as to the likely location was a pair of bars presented within the blindfield, a couple of degrees above and below the place where the target circle was to be presented. When these bars onset abruptly GY sometimes becomes aware of them. When they fade in and out he's sure that he never does, and says such things as: 'I'd be none the wiser if you weren't putting any cues up just to confuse me' (*ibid* p. 174). Whether he's aware of these cues or not, they do increase the likelihood that he'll guess correctly if the subsequent stimulus is presented in the cued location. They also increase the speed of his response (Kentridge *et al*., 1999; Kentridge and Heywood, 2001; Kentridge *et al*., 2004).

There is a temptation to say that GY's facilitated performance is just an effect of priming, or of perceptual readiness, and to deny that this is a case in which genuine *attention* is involved. If that were right then it would certainly not be a counterexample to the commonsense claim that consciousness is necessary for attention, but one suspects that the reason why one is tempted to say that this unconscious facilitation cannot be attention-involving is precisely because one is guided by the intuition that consciousness is necessary for attention. Since that's the intuition that's at issue, to rely on it would be to beg the question. We should admit that GY really is directing his attention. He himself describes his performance in those terms, and not only because he is picking up on the experimenters' way of speaking: It was a spontaneous remark by GY himself, made during a break in an earlier experiment, that prompted Kentridge and Heywood to examine attention within the blindfield (Kentridge and Heywood, 2001, p. 168).

We should grant, then, that the facilitative effect shown by this blindsighter is attention involving. The effect also looks to be one in which there is no consciousness since in some of its instances it is found even when GY shows no consciousness of the stimuli or of the cues. Nor can the case be blocked, as the previous cases were, by saying that, rather than displaying an absence of consciousness, GY is conscious of an absence. If that were the nature of GY's deficit then he would not be *blind* to one side of space, he would have a permanent *illusion* that nothing is happening over there. That is not what blindsight is like. The blindsighter does seem to be a case of attention without consciousness, and so to be a counterexample to the commonsense claim that consciousness is necessary for attention. If we look in more detail at what that commonsense claim amounts to, however, we can see that things are more complicated.

The commonsense claim is one that, as is often the case with claims about consciousness, can be interpreted in more or less substantive ways. There is one relatively straightforward sense of the word 'consciousness' according to which consciousness is the thing that marks the difference between the waking man and the man in a dreamless sleep. That minimal sense can't have been the sense that was in play when we said that consciousness is necessary for attention, or when we took the blindsighter's attention to be a counterexample to that claim: The blindsighter doesn't lack consciousness in that sense. The notion of consciousness in play in the claim that consciousness is necessary for attention is not the notion of consciousness as a monadic property of persons. It is the notion of a person's consciousness *of a thing*. The claim that attention is necessary for consciousness, as it figures in the present discussion, should be understood as saying that, for all persons and all things, if the person is attending to the thing then the person is conscious of that thing. It will be helpful to give this claim a label. Let's call it α:

α: For all persons and all things, if the person is attending to the thing then the person is conscious of that thing

To find a counterexample to α one would need to find a thing that a subject is attending to and is not conscious of.

It isn't clear that the blindsighter studied by Kentridge, Heywood and Weiskrantz provides us with a counterexample of that sort. This is because it isn't clear that the thing to which he's attending and the thing of which he is not conscious are one and the same. More specifically, it isn't clear that what he's attending to is a *thing* at all. In order to explain what I mean here it will be helpful to consider the sort of

attention that one pays when demonstrating that there is a blindspot on the retina. One typical way to demonstrate the blindspot is by taking a figure such as that shown below, closing one's right eye, and, with one's left eye, fixating the cross.

Figure 1. Blindspot demonstration

If one does this, and then moves the page to the correct distance from one's nose, the light from the section of page where the dot is will fall on the retina's blindspot, with the result that no information about the dot gets to the brain. The consequence is, of course, that the dot seems to disappear. When performing this demonstration one needs to pay attention. It is only because one is paying attention that one notices the dot disappear. But one is surely not conscious of the dot, which has disappeared, and from which no information is getting into the nervous system. What this example demonstrates for our purposes is that it is possible to be paying attention to a part of the visual field while not being conscious of the stimulus presented in that part of the visual field.

In the case of the blindspot demonstration it is not the dot that one is directing one's attention to, just the seemingly vacant part of space where the dot should be. The dot is not a thing that one is attending to, and so it is not a thing that one is attending to while not being conscious of it, and so it is not a counterexample to α, the claim that consciousness is necessary for attention.

Something similar can be said about the apparent counterexample to α created by the case of the blindsighter.

When the cues directing the blindsighter's attention facilitate his response to a circle presented in his blind hemifield, we have a counterexample to α only if (1) the blindsighter is not conscious of the circle and (2) the blindsighter is paying attention to the circle. The first of these conjuncts is satisfied — circles presented in the scotoma are the sorts of thing of which the blindsighter has no conscious awareness. But there is no counterexample here because the second conjunct is not satisfied — the facilitative effect of the cue can be understood as a consequence of the subject attending to the *location* in which the circle appears. There is no need to say that the blindsighter is attending to the circle itself.

That, by itself, is not enough to remove the threat to α, for suppose we go on to ask, not whether the circle itself is a counterexample to α, but whether the location of its presentation is a counterexample. The structure of the alleged counterexample is the same as before: The attended location provides a counterexample to α only if (1*) the blindsighter is not conscious of that location and (2*) the blindsighter is paying attention to that location. In the case of the circle it was possible to deny the second conjunct, but that was plausible only because we were prepared to accept a modified version of it that applies in the case of the location – we were able to deny 2 only because we were willing to accept 2*. We're therefore prevented from applying the same tactic again. The location to which the blindsighter attends will provide a counterexample to α unless we can find a way to deny 1*. And denying 1* looks, on the face of it, to be ridiculous since it involves claiming that the blindsighter is conscious of the locations in his scotoma after all.

What's needed, if we are to deny 1* without ridiculousness, is a way of claiming that the blindsighter is conscious of locations in his scotoma without thereby claiming that the blindsighter isn't really blind to things that are presented over there. This is less awkward than it might appear.

In normal situations, as when sitting at one's desk, one experiences oneself as being oriented in a space, even when there are parts of that space to which one is not currently perceptually receptive. Regions of the space in which one is oriented are potential loci for attention. One can, even with one's eyes closed, direct one's attention to different parts of the space around one's head, attending now to the region in front of one and to the left, now to the region behind and to the right. If all is silent then it may be that nothing in particular is experienced as being in these locations, but this does not prevent them from being parts of the space in which one experiences oneself as oriented, and it does not prevent them being loci of attention. The attention to locations in the scotoma demonstrated by the blindsighter can be thought of similarly.

GY is blindsighted in the sense that he doesn't see what's happening in one half of space. But the part of space that falls within GY's scotoma *does* figure in his conscious experience as a part of the spatial field in which his experiences are oriented. When moving objects, or suddenly appearing ones, are consciously experienced within the blindfield they are experienced in their correct spatial locations (Barbur *et al*., 2003). It is possible, then, to claim that the blindsighter is paying attention to a part of space, and that that part of space does

figure in his consciousness (as part of the space in which he is oriented), while still holding on to the fact that it is a part of space from which nothing is visually experienced.

If we think of the blindsighter in that way then the experiments demonstrating his capacity to attend to regions in his scotoma no longer pose any threat to α. The blindsighter is not conscious of the circle that he locates, but he is not paying attention *to the circle*, so this is not a counterexample to α. He is attending to a part of space, but that part of space is something that *does* figure in his consciousness (although he experiences nothing there). This is not a counterexample to α either.

Conclusion

We have reviewed the considerations that have led psychologists to the beliefs that attention is necessary for consciousness and that consciousness is not necessary for attention. We have found that both those beliefs contradict aspects of the commonsense picture of the attention/consciousness relation, and in each case we have found that the evidence supporting them is unpersuasive.

The commonsense view that attention requires consciousness is less vulnerable to refutation than is typically realized. It does not entail (1) that attention to an item must be preceded by consciousness of it, nor (2) that attention to a part of space guarantees consciousness of the items presented in that part of space, nor (3) that those properties that cause a item to catch one's attention must be properties that one is conscious of. Experimental results that refute one or other of these three claims do not thereby show that the view that attention requires consciousness is in need of revision.

The commonsense view that consciousness does not require attention is also less vulnerable to refutation than is typically realized. It is not refuted by findings indicating (1) that *some* items figure in consciousness only when attended, nor by findings indicating (2) that one must pay attention in order to be a position to have the demonstrative concepts necessary for conceptually structured thoughts about the things experienced. Both aspects of the commonsense picture of the attention/consciousness relation can be maintained.

References

Allport, Alan (1980), 'Attention and performance', in Guy Claxton (ed.) *Cognitive Psychology: New Directions* (London: Routledge & Kegan Paul).

Barbur, John L., Watson, J.D.G., Frackowiak, Richard S.J. and Zeki, Semir (1993), 'Conscious visual perception without V1', *Brain*, **116**, pp. 1293–302.

Block, Ned (1995), 'On a confusion about function of consciousness', *Behavioral and Brain Sciences*, **18** (2), pp. 227–87.
Block, Ned (forthcoming, 2008), 'Consciousness, accessibility, and the mesh between psychology and neuroscience', *Behavioral and Brain Sciences*.
Brewer, Bill (1999), *Perception and Reason* (Oxford: Oxford University Press).
Broadbent, Donald (1958), *Perception and Communication* (London: Pergamon Press).
Campbell, John (2002), *Reference and Consciousness* (Oxford: Oxford University Press).
Hardcastle, Valerie Gray (1997), 'Attention versus consciousness: A distinction with a difference', *Cognitive Studies: Bulletin of the Japanese Cognitive Science Society,* **IV**, pp. 56–66.
Kentridge, Robert W. & Heywood, Charles A. (2001), 'Attention and alerting: Cognitive processes spared in blindsight', in Beatrice De Gelder, Edward H.F. De Haan, and Charles A. Heywood (eds.), *Out of Mind: Varieties of Unconscious Processes* (Oxford: Oxford University Press).
Kentridge, Robert W., Heywood, Charles A. & Weiskrantz, Lawrence (1999), 'Attention without awareness in blindsight', *Proceedings of the Royal Society of London Series B: Biological Sciences*, **266**, pp. 1805–11.
Kentridge, Robert W., Heywood, Charles A. & Weiskrantz, Lawrence (2004), 'Spatial attention speeds discrimination without awareness in blindsight', *Neuropsychologia,* **42**(6), pp. 831–5.
Lamme, Victor (2003), 'Why visual attention and awareness are different', *Trends in Cognitive Sciences,* **7**(1), pp. 12–18.
Mack, Arien & Rock, Irwin (1998), *Inattentional Blindness* (Cambridge, MA: MIT Press).
McDowell, John (1996), *Mind and World* (Cambridge, MA: Harvard University Press).
Memmert, Daniel (2006), 'The effects of eye movements, age, and expertise on inattentional blindness', *Consciousness and Cognition* **15**(3), pp. 620–7.
Noë, Alva and Thompson, Evan (2004), 'Are there neural correlates of consciousness?', *Journal of Consciousness Studies*, **11** (1), pp. 3–28.
Posner, Michael (1980), 'Orienting of attention', *Quarterly Journal of Experimental Psychology*, **32**, pp. 3–25
Posner, Michael (1994), 'Attention: The mechanisms of consciousness', *Proceedings of the National Academy of Sciences*, **91**, pp. 7398–403.
Rensink, Ronald (2002), 'Change detection', *Annual Review of Psychology*, **53**, pp. 4245–77.
Ro, Tony, Russell, Charlotte & Lavie, Nilli. (2001), 'Changing faces: A detection advantage in the flicker paradigm', *Psychological Science*, **12**, pp. 94–99.
Schwitzgebel, E. (2007), 'Do you have a constant tactile experience of your feet in your shoes? Or, is experience limited to what's in attention?', *Journal of Consciousness Studies*, **14** (3), pp. 5–35.
Simons, Daniel & Chabris, Christopher (1999), 'Gorillas in our midst: Sustained inattentional blindness for dynamic events', *Perception*, **28**, pp. 1059–74.
Simons, Daniel (2000), 'Attentional capture and inattentional blindness', *Trends in Cognitive Sciences*, **4**, pp. 147–55.
Treisman, Anne (2003), 'Consciousness and perceptual binding', in Axel Cleermans (ed.) *The Unity of Consciousness: Binding, Integration and Dissociation* (Oxford: Oxford University Press).
Treisman, Anne and Gelade, Garry (1980), 'A feature-integration theory of attention', *Cognitive Psychology*, **12**, pp. 97–136.
Yantis, Steven (1993), 'Stimulus-driven attentional capture and attentional control settings', *Journal of Experimental Psychology*, **19** (3), pp. 676–81.

Paper received February 2007; revised January 2008