

Attention, Psychology and Pluralism

Henry Taylor

Abstract

There is an overriding orthodoxy amongst philosophers that attention is a ‘unified phenomenon’, subject to explanation by one monistic theory. In this paper, I examine whether this philosophical orthodoxy is reflected in the practice of psychology. I argue that the view of attention that best represents psychological work is a variety of conceptual pluralism. When it comes to the psychology of attention, monism should be rejected and pluralism should be embraced.

1. *The Monistic Consensus*
2. *The Varieties of Pluralism*
3. *Three Concepts*
 - 3.1 *Blindsight*
 - 3.2 *Executive attention*
 - 3.3 *Alerting*
4. *Pluralism*
 - 4.1 *Methodological conceptual pluralism*
 - 4.2 *Three monist interpretations*
5. *Philosophical Monism?*
6. *Conclusion*

1. The Monistic Consensus

Many philosophers hope to develop a ‘unified’ theory of attention. Christopher Mole is a prominent advocate of this approach:

‘This book presents a single unified theory of attention, intended to apply to attention in all its forms. According to this theory, ‘attention’ is not a family resemblance term, nor is it ambiguous, or folksy, or ill-defined, or nonreferring’ ([2011a], vii).

Almost all of the philosophers in the field share a commitment to the project of developing a theory of attention which is ‘unified’. Jesse Prinz describes his theory as: ‘a uniform, empirically motivated account of what attention is’ ([2012], p.95).

Carolyn Dicey Jennings calls her theory ‘a univocal account that fits normal use of

the term as well as its many associated phenomena' ([2012], p.535). Brian O'Shaughnessey describes attention as a 'unified phenomenon' ([2002], p.282). Wayne Wu says that:

'our aim is for a univocal account of attention... this book will pursue as much unification as can be squeezed out of philosophical argument informed by relevant empirical research' ([2014], pp.6-7).

Sebastian Watzl aims to give 'a unified characterization of conscious attention' ([2011], p.146). Montemayor and Haldjian say 'we believe that attention can be viewed as a uniform, yet graded phenomenon' ([2015], x) and they offer unified definitions of attention ([2015], p.2 and p.209). This view is also evident in the work of Philip Koralus ([2014]) and Declan Smithies ([2011]). Mole, Wu and Smithies summarise the situation well:

'Over the last fifteen years... the prospects for a unified explanation of attention have been regarded with renewed optimism' ([2011], xi).

The desire for a unifying analysis of attention manifests itself in an attempt to give a non-trivial set of necessary and sufficient conditions for attention. Such theories thus hope to find one concept (the content of which can be spelled out using necessary and sufficient conditions) that captures attention. Of course, different thinkers offer different accounts: for Mole ([2011a,b]) the conditions are to do with cognitive unison, for Wu ([2010], [2011a,b]) they are based around selection for action and so on. Whilst these thinkers disagree about what the unifying analysis of attention should be, they all agree that there is one to be found. Previously, I have

called this approach 'attention essentialism' (Taylor [2015]), but here I shall simply call it 'monism'.¹

Despite the popularity of monism, the motivations for it are extremely unclear. Wu ([2014], p.5) says that it is the most 'optimistic' option, but even if this is true, it is hardly an argument in favour of it. Mole ([2012]) notes that some of the arguments against monism have failed, but this does not constitute an argument in favour of it. Given the ambition of the proposal, the lack of clear argument for it is surprising.

This monistic consensus is not reflected in psychologists' view of attention. Elizabeth Styles says that: 'attention is not a single concept, but the name for a variety of psychological phenomena' ([1997], p.1). Similarly, Marisa Carrasco claims that: '[t]he field has developed a consensus that attention is not a unitary construct' ([2011], p.1517). Other psychologists have rejected monism in different ways. John Duncan ([2006]) claims that 'attention' is a family resemblance term, which is an idea we shall return to. Some psychologists go further, claiming that attention does not exist (Anderson [2011]). Alan Allport famously claims that that 'qua causal mechanism, *there can be no such thing as attention*' ([1993], p.203).

The disparity between philosophers and psychologists is striking, and demands investigation. Even though psychologists have frequently expressed dissatisfaction with monism, a non-monistic alternative has not been seriously considered by philosophers. It is this neglect that the present paper aims to remedy. In this paper I will *not* be examining specific monistic theories in depth. Needless to say, none of

¹ In my ([2015], p.54) I suggested pluralism as a 'plausible rival' to monism, but did not offer a direct argument for it.

them are without difficulties.² Rather, this paper will examine how attention research in psychology is actually carried out. I will argue that psychology proceeds by way of a variety of conceptual pluralism about attention. I further claim that a monistic concept of attention does not feature in the practices and assumptions of psychology, and that a monistic analysis would most likely be useless to psychology even if it did exist.

In §2 I distinguish between various versions of pluralism. Then I put forward three case studies of attention work in psychology, and argue that different concepts of 'attention' are involved in each (§3). In §4 I outline a particular version of pluralism, and argue that it represents psychological work better than monism. I close with some comments about the viability of monism when it is *not* understood as a claim about the psychology of attention, but about some other domain (§5).

2. The varieties of pluralism

Monism and non-monism can both come in a variety of forms. Whilst philosophers and psychologists have often expressed sympathy with one or other view, they have not always been clear on which version they intend, which gives rise to confusion. Regimentation is required. We can begin with a distinction between conceptual and natural kind pluralism.³ Conceptual pluralism is the view that there are several importantly different concepts of attention operative in psychology. Of course, monists about attention can accept this minimal claim, but they must claim that in addition to these different concepts, there is some 'overarching' monistic analysis of

² See Taylor ([2015]) for criticisms of some major monistic theories.

³ Eliminativism is also an option, but I will not discuss this extreme position in this paper.

attention, which gives a unified concept of attention in terms of necessary and sufficient conditions.

Furthermore, the conceptual monist should claim that this overarching concept of attention is somehow important for empirical work. Wu explicitly makes this claim when he argues that his analysis captures shared assumptions about attention amongst empirical psychologists ([2014], esp. pp.38-41). A monist could deny this: they could claim that attention can be given a monistic analysis, but that this analysis plays no important part in the practices of psychology. However, this paper is mainly concerned with whether monism or pluralism most accurately reflects the assumptions that drive psychological work so I will not primarily take as my target monist views such as these. I will however return to this suggestion in §5.

Conceptual pluralists differ from monists in that they accept the wide range of concepts of attention in psychology, but think that there is no common unifying concept of attention to be found, or at least not one that plays any important part in psychology. As an example, conceptual pluralism is now the accepted view of 'species' in biology: it is generally accepted that there are several alternative concepts of species, which categorise life differently. Which concept one employs is largely a pragmatic decision based upon the project one is engaged in (Ereshefsky [1998], [2010]).

Natural kind pluralism is not pitched at the level of concepts. Rather, it claims that the different expressions/instances/tokens of attention form a set that is too heterogenous to make attention a viable object of scientific study in its own right. On

this view, attention is not a natural kind.⁴ This view is held about concepts by Machery ([2009]) and about emotions by Griffiths ([1997]).⁵ In this paper, I will be arguing for conceptual pluralism rather than natural kind pluralism. This is because natural kind pluralism is not in opposition to monism. Monists are typically interested in developing a set of necessary and sufficient conditions for attention, and the success or failure of such a project is perfectly compatible with natural kind pluralism. The category 'set of planets beyond the orbit of the moon' is a perfectly well defined category of entities that we can give necessary and sufficient conditions for. However, this is compatible with those entities not being a natural kind.⁶ As such I will set natural kind pluralism aside in what follows and focus on conceptual pluralism.

3. Three concepts

Conceptual pluralism itself comes in a variety of strengths. It could be that there are different concepts of attention operative in psychology, but that this is merely due to conceptual sloppiness on the part of the psychologists.⁷ The pluralism I have in mind is more substantive than this. I will argue that the differences between the different concepts are due to the fact that they are each designed to fill specific theoretical roles. The result is several distinct but fruitful concepts of attention, each suited for different purposes within psychology. On this view, psychologists are not being conceptually sloppy, they are simply selecting the right concept for the job.

⁴ One could hold both kinds of pluralism: that there are a variety of different concepts of attention, and that their referents do not form a natural kind.

⁵ These thinkers extend their arguments to establish eliminativism.

⁶ Example from Griffiths ([1997]).

⁷ Thanks to an anonymous referee for suggesting this.

Another way for conceptual pluralism to vary in strength is in terms of the concepts' referents. For example it could be that the various different concepts all have the same referent. I will argue that this is not the case, and that the different attention concepts pick out faculties that can be experimentally dissociated. We must now turn to the three cases that will form the core of the argument for pluralism.

3.1 Blindsight

The first case comes from the experiments that use the Posner paradigm (Posner [1980]) to examine the effects of attention on *unconscious* visual processing. One experiment concerns the blindsight subject GY.⁸ An arrow was presented in GY's healthy field (where GY has normal vision, as opposed to his blindfield, to which he is 'blind'). The arrow was sometimes followed by the presentation of a small disc in the portion of GY's blindfield in the location that the arrow had pointed to (the valid condition), sometimes the disc appeared away from where the arrow pointed (invalid condition), and sometimes the disc was not presented at all (absent condition). There then followed an auditory cue, which prompted GY to press a button if he felt that the disc had been present (Kentridge et al. [1999], p.1806). Some variants were carried out on non-neurologically impaired subjects, and to test exogenous and endogenous attention, as well as object-attention (Kentridge et al. ([1999], [2004], [2008]), Norman et al. ([2013])).

GY 'did not report awareness of a single [disc]' but his guesses were above chance in all conditions (Kentridge et al. [1999] p.1808). The crucial result is that GY had decreased reaction times in valid conditions, i.e. when the cue *correctly* indicated

⁸ Blindsight sufferers are unaware of stimuli placed within a certain portion of their visual field, but are capable of simple visual discriminations with regard to these stimuli.

where the disc would appear (Kentridge et al. [1999], p.1807). The experimenters take this to indicate that attention was paid to the disc in these conditions (Kentridge [2011], pp.239-240). The experimenters concluded that they had:

‘demonstrated that attention could selectively modulate the processing of a target without that target’s entering awareness’ (Kentridge [2011], p.240)

They also claim that:

‘attention to a target (reflected in the selective [reaction time] advantage) was not a sufficient condition for awareness of that target’ (Kentridge et al. [2004], p.831).⁹

What do the experimenters mean when they discuss attention in this case? Plausibly, what Kentridge has in mind involves the selection of information. This is shown by his definition of attention as:

‘the use of information to facilitate the execution of a task to which many stimuli might potentially provide the solution’ ([2011], p.229).

He also says that attention should ‘exclude some irrelevant stimuli from consideration’ ([2011], p.229) indicating that selection is a core component of how he thinks about attention. The experimenters also refer to attention as a ‘selective processing advantage’ ([2008], p.864) and tend to use the terms ‘attention’ and

⁹ Prinz ([2012]) resists this conclusion, offering a different interpretation. Prinz’s case is complicated, and I do not have the space to fully examine it here, but this paper only concerns what *concept* of attention the experimenters had in mind, not whether they successfully established their intended conclusion, so these issues can be sidestepped. Furthermore, in previous work ([2013]) I have argued that the disagreement between Kentridge and Prinz is really due to them employing different concepts of ‘attention’. If this is the case, then the disagreement will all be grist to the pluralist mill. Mole ([2008]) questions these experiments as well, but has changed his mind ([2014]).

'selective attention' interchangeably (e.g. [2004], p.831; [2008], p.864) indicating that they take selection to be a core part of attention.

Furthermore (though this claim is not strictly speaking required for my argument) there is good reason to think that the concept used by these experimenters does not *simply* amount to 'selection of information' but must be more specific. Consider the aim of the experiments: to demonstrate attention without conscious awareness. If all the experimenters mean by 'attention' is 'selection of information' then this claim would be trivial, because it is already known that selection of information can occur in the absence of consciousness (by the movement of the eye and at a low-level in the visual system).¹⁰ So, in order for their conclusion to be substantive and interesting, the experimenters must mean something more specific than mere 'selection of information'. Plausibly, they are thinking of attention as a relatively high-level selection mechanism. This is entirely unsurprising. After all, 'selection of information' is such a wide ranging concept that thinking of attention *merely* in these terms would make the concept unable to deliver a substantive conclusion. Notice that using this specific concept of attention is not an arbitrary or sloppy choice on behalf of the experimenters, but it is crucial to their theoretical work.

3.2 Executive attention

In the previous section, I outlined a case where experimenters employ a concept of attention that involves selection. In this section, I will discuss a concept of attention

¹⁰ For example, see Milner and Goodale's discussion of selective mechanisms in the dorsal stream ([1995]).

which does not involve 'selection' at all, this is Posner and Rothbart's 'executive attention'. They define it as follows:

'executive attention involves mechanisms for resolving conflicts among thoughts, feelings and responses' ([2007], p.7).

In this quotation, there is no implication that executive attention need involve some kind of selection of information. Executive attention is defined in terms of conflict resolution in various modalities. Executive attention is also often linked with *control* properties (Simonds et al. [2007], p.475). Whilst the experimenters in the blindsight case commented that attention should involve excluding irrelevant information (which is one way in which they ally attention with selection), no such criterion is placed on executive attention.

Indeed, psychologists who discuss executive attention explicitly *contrast* it with what they call 'orienting', which they define as 'selection of information from sensory input' (Posner and Rothbart [2007], p.7) showing that they actively wish to distance the notion of executive attention from idea of attention as a selective mechanism (I will have more to say about orienting shortly). What we clearly see is two distinct concepts of attention: one that characterises attention in terms of certain selection properties, and the other in terms of conflict resolution and control properties.

To understand why the 'executive attention' concept is defined in this way, we must look to its distinctive theoretical role. Executive attention is invoked to explain abilities such as effortful self-control (Rothbart and Rueda [2005]) and self-regulation (Posner and Rothbart [2009], Rothbart and Posner [2006]), which can include emotional self-regulation (Simonds et al. [2007]). The properties that are crucial to

explaining these abilities are conflict resolution properties, and those properties that contribute to explaining the subject's control (e.g. Posner and Rothbart [2009], pp.106-109). So defining attention in terms of these properties makes the concept suited for use in predictions and explanations for which these properties are relevant. It can also be used to pick out faculties that have such properties, which makes it useful in contexts where those properties need to be measured and investigated.

Work on executive attention is not unusual or idiosyncratic in characterising attention in terms of control and conflict resolution properties. It is reminiscent of the idea of attention as a 'supervisor' which manages and controls the various subcomponents of working memory (Baddeley [2003]).¹¹

Against my suggestion that selection is not part of the executive attention concept, it may be replied that when we examine the experimental context in which executive attention is invoked, we will see that the executive attention concept does involve informational selection after all.¹² To examine this suggestion, we will need some details of the experimental conditions (fig. 1).

¹¹ Another example is the 'feature integration' theory of attention, which does not explicate attention in terms of selection but in terms of binding properties, and construction of the visual scene more generally (Treisman and Gelade [1980], Treisman [1996]). Of course, it could be questioned how well the feature integration theory has held up empirically, but this is not germane to the present discussion: whether or not the theory is empirically successful, it still demonstrates a majorly historically significant context where a concept of attention is deployed which does not involve selection as a core component.

¹² Thanks to an anonymous referee for pushing me on this.

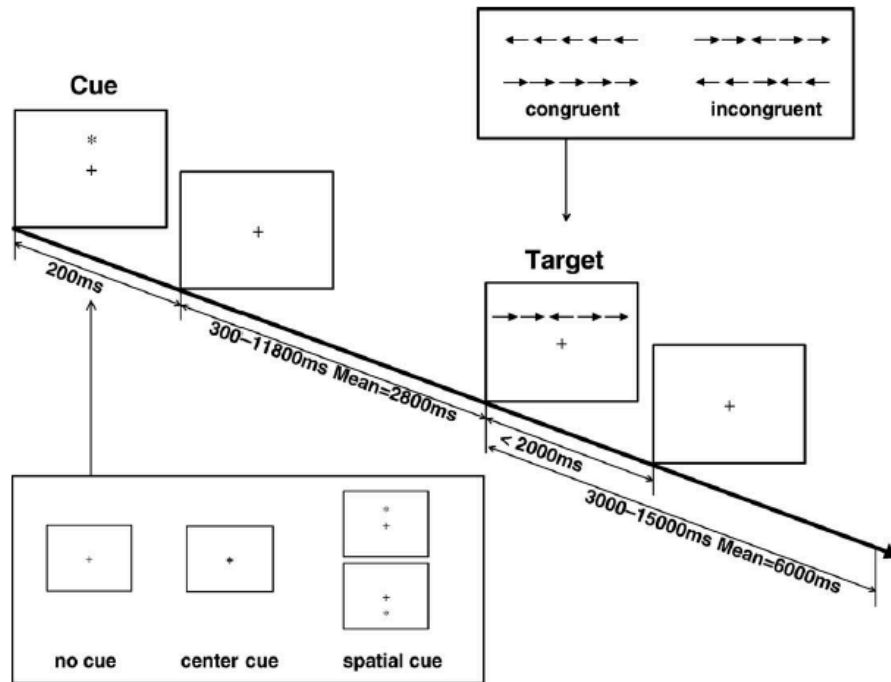


Figure 1: The attentional network task. Reprinted from *Neuroimage*, 26 (2), Fan, J., McCandliss, B., Fosella, J., Flombaum, J. and Posner, M., 'The activation of attentional networks.', 471-479 Copyright (2005) with permission from Elsevier.

Executive attention is tested using the 'attentional network task' (Fan et al. [2002], [2005]; Rueda et al. [2004], Posner and Rothbart [2007]). In this, subjects are presented with a cue (or sometimes not, in the no cue condition). The cue sometimes informs the subject when a target will appear (this is the purpose of the center cue in fig.1), sometimes where it will appear (the spatial cue in fig.1) and sometimes both. Subjects are then presented with a target either above or below their fixation point. The target is an arrow, and subjects are asked to indicate which direction it is pointing in. As can be seen in fig.1, the target arrow is also flanked by other arrows, two on each side. In the congruent condition, the target points in the same direction as the flankers and in the incongruent condition, it points in the opposite direction (see the box in the top right of fig.1). Executive attention is measured by subtracting the reaction time in the congruent conditions from the incongruent ones.

Now, in order to complete this task, subjects have to take information about the target and the flanking arrows, process information about them, and then use this to inform their response. It can be tempting to conclude from this that they are *selecting* such information, and then to draw the conclusion that selection is part of the concept that this paradigm is being deployed to test i.e., executive attention.

However, this would be an incorrect inference. It is certainly true that subjects do have to 'select' information in some sense in order to complete this task, but we should not infer from this that selection is part of the *concept* of 'executive attention'. To see that this inference is problematic, consider that *any* task in experimental psychology at all that involves a visual display will inevitably involve selection, because subjects will have to select information from the display in order to fulfil the task. Indeed, this does not just apply to *visual* psychology but to all psychological tasks. As Mayr and Kleigl say: '[e]very experimental task requires some kind of selection' ([2000], p.1124). However, the fact that the task involves selection is just a feature of it being a psychological task at all, it would be a mistake to conclude from this that psychologists take a certain *concept* to have selection as its core feature. For example, memory can be tested by using paradigms that involve selection, such as visual displays which require subjects to select information and retain them for later recall (e.g. Quervain et al. [2000]), but it does not follow from this that selection is a core component of the concept 'memory'.¹³

Furthermore, examine the consequences if we did accept the inference from the claim that selection is involved in completing the task to the claim that the *concepts*

¹³ Nor does not follow that it is not a core feature of the concept. The point is that this feature of the experimental procedure does not demonstrate whether or not selection is part of the concept.

that are deployed in relation to the task have selection at their core. Because of the widespread use of procedures that involve selection, we would have to take selection to be at the core of pretty much *every* concept within experimental psychology! Then every concept in psychology would be some version of the 'selection' concept, and the distinctiveness and usefulness of the 'selection' concept (which we saw used in the blindsight studies above) would be lost.

To be clear: I am not saying that the experimental setup has no relevance to helping us understand the concepts in question, I am saying that we cannot infer from the fact that subjects have to select information from the visual display that selection is a core component of the concept being deployed by the psychologists. If we are to use the experimental setup to draw conclusions about the concepts being used, we will need a more subtle approach. I shall now argue that a detailed examination of the paradigm supports the view that selection is *not* a core feature of the executive attention concept.

Recall that executive attention is tested using the attentional network task, by subtracting the reaction time of cases where a target arrow was congruent with its flankers from cases where the target was incongruent. The experimenters are clear about which properties they intend to measure with this experimental condition:

'Subtracting [reaction times] for congruent from incongruent target trials provides a measure of conflict resolution and assesses the efficiency of the executive attention network' ([2007], p.8)

In this quotation, the experimenters are clear: the procedure is intended to measure the efficiency of conflict resolution and they take *this* to be a marker of executive attention, not selection. So, as the experimenters themselves point out, the

properties that the paradigm is designed to measure when testing for executive attention are *not selection properties*.

Furthermore, when we examine the paradigm in more depth it becomes clear that it is specifically designed to *separate* executive attention from forms of selective varieties of attention, which again supports the claim that selection is not part of how the psychologists are thinking of executive attention. Above, I mentioned that the experimenters describe 'orienting' in terms of selection of information, and distance it from executive attention. These forms of attention can be experimentally separated using the attentional network task. As mentioned, the crucial variable in the test for executive attention is the congruent/incongruent variation. Conversely, the crucial variation to test for orienting is whether the location of the target was cued or not (Fan et al [2002], [2005]; Posner and Rothbart [2007]). These two factors can be manipulated entirely independently of one another, allowing a dissociation between orienting (which involves informational selection) and executive attention.

Since the experimental setup is specifically designed to *dissociate* executive attention from forms of attention involving informational selection, this further supports the view that informational selection is *not* part of how the psychologists understand executive attention. As I pointed out above, this tallies with what the experimenters *say* about executive attention when they define it.

It has been suggested to me that notions such as conflict resolution and control (by which executive attention is explicated) themselves just amount to varieties of informational selection, and thus that the executive attention concept contains

informational selection as part of its unpacking.¹⁴ However, it seems extremely unlikely that this is how the psychologists themselves are thinking about these notions, given the efforts they go to distance executive attention from selection-based varieties of attention. There is also no independent reason to interpret them in this way, apart from commitment to the idea that all concepts of attention must involve informational selection, which clearly cannot be assumed in the present context on pain of question begging. Indeed, there is no reason to assume that notions such as ‘conflict resolution’ and ‘control’ stand in need explication: the experimenters certainly take them to be sufficient on their own terms to help grasp ‘executive attention’.

A final point is necessary, to guard against misinterpretation: my claim is that the executive attention concept is distinct from the ‘informational selection’ concept in the sense that each one places different conditions that something must fulfil in order to fall under the extension of each concept. However, it is perfectly possible that some process may involve selection *and* conflict resolution properties, and thus fall under the extension of both concepts. My argument primarily concerns the concepts involved, but it does not entail that the sets of entities that they pick out are mutually exclusive.

3.3 Alerting

I have outlined two concepts of attention, one of which has selection of information at its core, and the other has conflict resolution and control properties. The final case is what Posner and Rothbart refer to as ‘alerting’:

¹⁴ Thanks to an anonymous referee for suggesting this.

‘Alerting is defined as achieving and maintaining a state of high sensitivity to incoming stimuli’ (Posner and Rothbart [2007], p.7).

Here again, the definition of ‘alerting’ is different from the definitions of the two concepts encountered above: here the distinctive features are sensitivity to the external world. Why is alerting defined in this way? Again, the answer is because theoretical use demands it. Alerting is invoked in the study of attention deficit hyperactivity disorder (ADHD). Some of the properties that are distinctive of ADHD sufferers are linked to their inability to maintain sensitivity to incoming stimuli (Johnson et al. [2008]).¹⁵ Thus, by defining the term as they do, ‘alerting’ can feature in explanations and predictions to which these properties are especially pertinent, such as in the study of ADHD.

Like executive attention, alerting is also tested using the attentional network task described above (fig.1). Alerting is measured by subtracting the reaction times in trials where cues indicate when (but not where) targets will appear from reaction times in no-cue conditions (Fan et al. [2002], [2005]). Of course, subjects must select information in order to perform this task, but (as was the case before) this cannot be taken to imply that the alerting concept has selection as one of its core features. Indeed (as was the case for executive attention), the experimenters distance alerting from the kind of attention that involves selection (esp. Fan et al. [2002]). Importantly, the conditions that test for alerting can be varied independently of those that test for orienting and executive attention, meaning that all three kinds of attention can be empirically dissociated from one another.

¹⁵ ADHD sufferers also show impairments of executive attention.

It may be responded that the concept 'alerting' is best unpacked as a *disposition to select*, and so the concept does involve selection of some kind. However, similar points as were made in relation to executive attention can be made here as well: this is not accurate to how the psychologists themselves seem to understand alerting, as they distance alerting from selective attention. Strikingly, some of them refer to the ability to maintain sensitivity to incoming stimuli as 'non-selective attention' indicating that selection is not a necessary part of how they are thinking of this concept (Fresciello et al. [2002], Vallone et al. [2002]).

Secondly, even if it were the case that the 'alerting' concept is unpacked as a disposition to select, the concept would still be distinct from the 'executive attention' concept, where selection is not invoked *at all*. Indeed, it would still be an importantly different concept from that used in the blindsight experiments, because (as is evident from the quotations given in §3.1), those experimenters do not think of attention in dispositional terms, but rather they characterise it as the active selection of information for the completion of a task. Conversely, by characterising alerting in terms of sensitivity, the 'alerting' concept is essentially and irreducibly dispositional.

My aim is to show that the concepts in question are importantly distinct and the difference between the dispositional and non-dispositional concepts is sufficient to demonstrate this distinctness.¹⁶ However, it is consistent with this that there are some links between the concepts. After all, the monist position is much stronger than just the view that there are some links between the different concepts of attention in psychology.

¹⁶ At one point Wu ([2011a], p.108) suggests that when something is 'available' for use by the subject, this implies that it is 'still selected'. However, Wu's claim is implausible: to be available is different from actually being selected.

Work on blindsight, executive attention and alerting are not idiosyncratic or obscure areas of psychology. They are all major areas of research, so I cannot be accused of cherrypicking outliers. Of course, the cases presented in this section do not refute monism, as monists will offer another interpretation of them. It is to these issues that I now turn.

4. Pluralism

I firstly summarise my pluralist interpretation of the three cases (§4.1) then argue that it is more plausible than the monist alternative (§4.2).

4.1 Methodological conceptual pluralism

On the view I urge, different psychologists are simply using distinct concepts of 'attention'. The concepts differ in that they place different conditions for something to fall under the extension of that concept. In the examples given, these conditions may be selection properties, conflict resolution and control properties or dispositional sensitivity properties. The faculties that these concepts refer to can also be dissociated, as is shown by the dissociations given by the attentional network paradigm.

Why are there different concepts? On my view, this is explained in terms of distinct theoretical roles, for which distinct concepts are required. Which specific concept is used will be determined by the theoretical context in question. We can label this view 'methodological conceptual pluralism' because it is conceptual pluralism, driven by methodological/theoretical considerations. Notice that in the three examples given above, the fact that experimenters give the particular definitions that they do is *not* due to psychologists being unreflective or simply not

giving enough consideration to how to define their terms. On the contrary, the specific definitions are carefully tailored to the particular theoretical roles that each concept must fulfil.

This stands opposed to the picture that the monist urges. On methodological conceptual pluralism, what we mean by 'attention' is determined by theoretical context, not a common essence that is shared by the different expressions of attention. The pluralist view not only fits with the three examples given above, but also with the more general psychological literature. For example, Allport ([2011]) and Chun et al. ([2011]) taxonomise attention using various different concepts. The two taxonomies diverge from one another, because the concepts employed in each are unique. Furthermore, the different concepts are justified by their being theoretically useful for particular theoretical roles.

4.2 Three monist interpretations

Recall that conceptual monism is the view that there is one monistic concept of attention, the content of which can be stated in terms of a set of necessary and sufficient conditions for attention. In this section, I consider three interpretations that a monist might give to the cases outlined in §3.

The first option is to accept my general pluralistic view about psychology, but to claim that monism is not to be understood as a thesis about psychology, but about some other domain. I will defer discussion of this proposal until §5. Similar points apply to the suggestion that there is a monistic analysis of attention, but it plays no part in the practices and assumptions of psychology. To accept this is to accept my main point: that the practice of psychology does not proceed in line with conceptual monism, so I set this aside in what follows.

The second option for the monist is to claim that (contrary to my interpretation) the psychologists are all in fact working with *the same* concept of attention. The third option is to accept that they are working with different concepts, but claim that they are all subconcepts of a more abstract and general monistic concept. I take each of these in turn.

Regarding the second option, the monist could claim that all of the thinkers are using the same concept of attention, and that the differences pointed out above merely reflect the fact that in different contexts, the same concept can pick out different referents, which can have different properties. This is an implausible explanation of the three cases given above, for several reasons. For one thing, the claim that all of the thinkers are working with the same concept of attention contradicts how they themselves define their terms. As we have seen, they invoke quite different features in their definitions. To say that really they are all the same concept seems to clearly run against this. Furthermore, one of the core reasons to introduce talk of executive attention and alerting in the first place was to allow us to make fine-grained distinctions between alternative kinds of attention. If they were just the same concept, they could not perform this task.

In any case, the examples outlined above cannot merely be explained as a difference in the context in which the concepts are deployed. Recall that the attentional network task allows us to dissociate alerting and executive attention (Fan et al. [2002], [2005]). This dissociation is important: in some experimental conditions, alerting can be absent, but executive attention present.¹⁷ This means that even in *the*

¹⁷ Such a dissociation can be gained in cue-absent conditions with incongruous targets (Fan et al. [2002]). Of course, other conditions will give other dissociations.

same context the subject can fulfil the requirements associated with executive attention, but not alerting. 'Executive attention' and 'alerting' cannot be the same concept, but placed in different contexts, because here the context is the same, but one concept applies, and the other does not.

The third monist proposal is more subtle: it accepts that there are distinct concepts, but claims that they are subconcepts of a more abstract overarching monistic concept, operative in psychology, whose content can be given using necessary and sufficient conditions. Such an overarching concept would capture what is similar between the different kinds of attention that the various individual concepts pick out, but ignore their differences. The analogy would be with 'triangle' and 'circle', which are distinct concepts, but are both subconcepts of 'shape'.

In order to vindicate this proposal, it is not enough for the monist to point to some shared features of the individual concepts or their referents. For example, it might be pointed out that (though the different concepts pick out their referents in virtue of different properties) the properties in question are all *functional* properties. Suppose for the sake of argument that this is true. Still, it does not vindicate monism because it includes too much: it also applies to other psychological faculties (such as working memory) and the concepts that are used to pick out those faculties as well. The monist must claim that the concept captures *all and only* the expressions of attention, and that this concept is somehow important to psychology.

Despite the ambition of the monist proposal, notice that it cannot ever be refuted because no matter how many different concepts of attention are elucidated, or how many differences we find between them or their referents, it will always be open for

the monist to insist that we need to ignore these differences and continue the search for the overarching concept. The monist can always insist that we keep on looking!

Nonetheless, there are several points that can be made against it and in favour of pluralism. The first is parsimony. The current monist proposal involves accepting a variety of different concepts of attention operative in psychology. In this sense it is in agreement with pluralism. However, the monistic view also involves accepting an *extra* commitment: some overarching unifying monistic concept. Methodological conceptual pluralism has all of the resources to explain the development and deployment of concepts of attention in psychology purely in terms of theoretical pragmatics. So, why make the extra commitment? We are owed an argument before we accept the less parsimonious view, but (as mentioned in §1) arguments in favour of the monistic approach are extremely hard to find.

This parsimony objection can be sharpened when we consider what kind of concept the monist must posit. As I have been arguing, examination of the psychological literature does not reveal an overarching concept of attention, but rather a variety of different concepts. In addition (as I pointed out in §1) many psychologists actually deny the existence of a common overarching concept (Duncan [2006], Carrasco [2011]). So, the monist must claim that the overarching concept is inexplicit in psychological work, and that many psychologists deny its existence but also that the concept is important to driving psychological work in the field and at the very core of how psychologists think about attention. There is a peculiar friction here between how important this concept is supposed to be for psychology and the fact that it is inexplicit and that many psychologists deny its existence. Between a view which posits such a peculiar concept and the pluralist view, which simply takes

what psychologists say at face value, the monistic position carries a very heavy burden, and it is difficult to see why we should adopt it. To be clear: I am not saying that it is impossible for a concept to have the particular features that the monist is committed to, I am simply saying that between these two views, parsimony counts very strongly in favour of pluralism.

It is also incumbent upon the monist to explain why the concept is inexplicit, and why psychologists deny that there even is one. It has been suggested to me that this could be explained by attributing conceptual sloppiness, or some lack of conceptual expertise on the part of psychologists.¹⁸ It may be said that they simply do not know how to explicate their own core concept of attention, and that they are simply incorrect to deny the existence of the core conception. However, this is not a plausible route for the monist to go down. Firstly, it is *ad hoc* to accuse psychologists of this just because what they say violates one's own view. The pluralistic view is not forced into this position. There is also a deeper problem with this suggestion, which is that it involves accepting that psychologists are conceptually sloppy and inexpert but also that their conceptual practices have a neat unity in the sense that they all think of attention in the same way. This is odd: if psychologists were sloppy to the extent that the current proposal suggests, then unity is precisely the opposite of what we would expect.

So, the monist proposal is less parsimonious and carries with it implausible commitments. Another substantial point against this monist view is that it is doubtful that the overarching concept would be useful in psychology. To see this, suppose that there were some monistic analysis of attention. In order to be

¹⁸ Thanks to an anonymous referee for pushing me on this.

successful, this analysis must be general enough to capture only the similarities between the different faculties that the individual concepts examined in this paper refer to, and ignore their differences. This is required in order to capture what all of these entities have in common.

As we have seen, what makes each individual concept useful is its specificity. Take the 'executive attention' concept. The concept's usefulness stems from its ability to pick out a faculty in virtue of the specific properties of conflict resolution and control, and to distinguish this from other faculties that do not share these properties. Similar things are true of the other two concepts: what makes them useful is their ability to pick out faculties in virtue of specific properties that are not shared by the faculties that the other concepts pick out. Since any successful monistic analysis could only capture what is common to the various referents of the attention concepts, it could not include mention of properties that are specific to particular faculties, such as conflict resolution, selection or sensitivity properties. However, since what makes the individual concepts useful is their ability to pick out entities in virtue of these very specific properties, then a monistic analysis would be unable to fulfil the theoretical roles that are fulfilled by the individual concepts. What makes the individual concepts useful is precisely their specificity, and since the monistic analysis could not be that specific (because of its nature, it cannot capture specific features of each concept, but only the similarities between them) then it could not fulfil the theoretical roles that each individual concept fulfils.

The overarching concept would thus be too vague and cumbersome to fulfil the theoretical roles that are associated with each individual concept. Conversely, it is much more difficult to think of contexts where the overarching concept can perform

theoretical or explanatory work that the individual concepts could not. For example, if we wanted to make wide ranging predictions or explanations that concern all three of the faculties that the concepts in this paper refer to, we could simply frame our claims in terms of a conjunction of executive attention, alerting and the selective concept: there is no need for the kind of overarching analysis that the monists propose. The individual concepts supply all of the conceptual resources required to do the theoretical work in psychology, there is nothing left for a monistic theory to do.

An analogy will help make this point clearer. Consider the various 'species' concepts in biology. The different concepts classify organisms into species in virtue of different properties of those organisms, such as phylogenetic ancestry, DNA similarity, ecological niche or interbreeding properties (Ereshefsky [1998], [2010]). It may be that we could give some overarching monistic analysis of 'species' of which all of these concepts are merely subconcepts, perhaps 'a group of organisms' would be such a monistic analysis of what a species is. However, such a 'species' concept cannot perform any of the work that the individual concepts perform because it is simply too cumbersome and vague to be useful to biology. Conversely, there are no theoretical roles that the concept 'a group of organisms' can perform that cannot simply be done directly in terms of phylogenetics, DNA similarity, etc. In the same way, there is an asymmetry between the theoretical importance of the individual concepts of attention, and the lack of usefulness of the overarching concept.

I have provided reasons against the monistic view of attention, at least as it pertains to psychology. What considerations might be given against pluralism? Monists may worry that pluralism implies that the different attention concepts in

psychology have absolutely nothing in common. Jesse Prinz mentions an issue like this ([2012], p.91) and suggests that it may result in the term 'attention' being eliminated from psychology!¹⁹ In response to such worries, firstly note that pluralism doesn't entail that the concepts have *nothing* in common. It is consistent with what I have said that they share a family resemblance. This is a plausible suggestion, but I do not have the space to fully examine it here. Secondly, Prinz's argument is based on the assumption that we should avoid the conclusion that the concepts have nothing in common, and that we should avoid eliminativism if possible. But there is nothing in itself wrong with these conclusions. If that is where our best arguments lead us, so be it. Prinz's argument carries no weight against pluralism.

5. Philosophical monism?

The monist could try to sidestep the arguments in this paper by claiming that her view should not be interpreted as concerning 'attention' as discussed in psychology. Rather, monism could be interpreted as the attempt to develop some distinctively philosophical notion of attention. Interpretation of the monistic project is complicated by the fact that monists are not always clear about what their stated aims are, but it has been suggested to me that philosophers should be read as developing an account of the personal or subject-level level faculty of attention, whilst psychologists are discussing the subpersonal mechanisms that underpin this

¹⁹ A similar worry is raised by Smithies ([2011], pp.251-252).

phenomenon.²⁰ It could be said that monism about the former is compatible with pluralism about the latter.

My main purpose in this paper has been to investigate attention in empirical psychology. For this reason, I will restrict myself to two comments about ‘philosophical’ monism, one specific and one general. The specific point is that the distinction between the philosophical and psychological notions cannot be drawn along the personal/subpersonal line, as has sometimes been suggested. Some psychologists are explicit that one of the things they are interested in is personal-level attention (Allport [2011], p.26). As we have seen, even psychologists who do not use this locution frequently make reference to faculties such as self-control and emotional regulation, which are personal-level phenomena. Similarly, philosophers do not always understand attention as a personal-level thing. Mole ([2011a]) believes that attention can be instantiated by football teams, which are not persons at all. If there are distinct philosophical and psychological notions of attention, then the differences between them must be more complex than the distinction between personal-level and subpersonal attention.

The general point is that adopting a distinctively ‘philosophical’ monism will likely lead to an even more radical version of pluralism than I have argued for. Assume that there is some philosophical notion of attention, which is distinct from the psychological one, and that monism is true for this philosophical notion. What would result would then be a case where attention research bifurcates fundamentally into philosophical work on attention (for which monism is plausible), and

²⁰ Wu ([2014], p.30) advocates this division with relation to philosophical and *neuroscientific* (not psychological) work on attention. Other monist projects may be interpreted in this way too, especially Dicey-Jennings ([2012]) who places a lot of emphasis on the subject.

psychological work (for which pluralism is plausible). This would be pluralism one level up.

6. Conclusion

Despite the monistic orthodoxy in philosophy, the consensus in psychology is still toward a variety of non-monism. I have argued that when it comes to the psychology of attention, psychologists are right and philosophers are wrong: methodological conceptual pluralism is the way to go.

Faculty of Philosophy,

University of Cambridge,

Sidgwick Avenue, Cambridge,

CB3 9DA

jht30@cam.ac.uk

Acknowledgements

Thanks to Chris Mole, three anonymous referees and the editors for useful comments on previous drafts of this paper. Special thanks to one anonymous referee for extensive, sympathetic and careful comments, which have improved the paper immensely. Thanks to Ned Block, Robert Kentridge and Peter Vickers for helpful discussion, and comments on previous work. I am grateful to the Royal Institute of Philosophy for a Jacobsen Fellowship, which supported me while research for the paper was carried out, and during the initial writing phase. I am also grateful to the Leverhulme Trust and Isaac Newton Trust for an Early Career Fellowship (ECF-2015-088), which supported me while the paper was revised.

References

- Allport, A. [1993]: 'Attention and control. Have we been asking the wrong questions?' In Meyer, D. E. and Kornblum, S. (eds.) *Attention and performance, XIV*. Cambridge, MA: MIT Press, pp.183-218.
- Allport, A. [2011]: 'Attention and integration.' In C. Mole, W. Wu, and D. Smithies, (eds.) *Attention: Philosophical and Psychological Essays*. New York: Oxford University Press, pp.24-59.
- Anderson, B. [2011]: 'There is no such thing as attention.' *Frontiers in Psychology* **2**, pp.1-8.
- Baddeley, A. [2003]: Working memory: looking back and looking forward. *Nature reviews: Neuroscience*, **4**, 829-839.
- Carrasco, M. [2011]: 'Visual attention: the past 25 years', *Vision Research* **51**, 1484-1525.
- Chun, M., Golomb, J. and Turk-Browne, N.B. [2011]: 'A taxonomy of internal and external attention', *Annual Review of Psychology*, **62**, 73-101.
- Dacey Jennings, C. [2012]: 'The subject of attention', *Synthese*, **189**, 535-554.
- Duncan, J. [2006]: 'Brain mechanisms of attention', *The Quarterly Journal of Experimental Psychology*, **59**, 2-27.
- Ereshefsky, M. [1998]: 'Species pluralism and anti-realism', *Philosophy of Science*, **65**, 103-120.
- Ereshefsky, M. [2010]: 'Microbiology and the species problem', *Biology and Philosophy*, **25**, 553-568.
- Fan, J., McCandliss, B., Sommer, T., Raz, A. and Posner, M. [2002]: 'Testing the efficiency and independence of attentional networks', *Journal of Cognitive Neuroscience*, **14**, 340-347.
- Fan, J., McCandliss, B., Fosella, J., Flombaum, J. and Posner, M. [2005] 'The activation of attentional networks,' *Neuroimage*, **26**, 471-479.
- Fresiello, A., Grammatikopolous, G., Pignatelli, M. and Sadile, A. [2002]: 'Environmental factors during postnatal period modify activity and non-selective attention in the Naples high excitability rat', *Behavioral Brain Research*, **130**, 111-115.
- Griffiths, P. E. [1997]: *What Emotions Really Are*. Chicago: University of Chicago Press.
- Jennings, C. D. [2012]: 'The subject of attention', *Synthese*, **189**, pp.535-554.
- Johnson, K., Robertson, I., Barry, E., Mulligan, A., Dáibhis, A., Daly, M., Watchorn, A., Gill, M., Bellgrove, M. [2008]: 'Impaired conflict resolution and alerting in children with ADHD: evidence from the attentional network task (ANT)', *Child Psychology and Psychiatry*. **49** pp.1339-1347.
- Kentridge, R. [2011]: 'Attention without awareness: a brief review', In C. Mole, W. Wu, and D. Smithies, (eds.) *Attention: Philosophical and Psychological Essays*. New York: Oxford University Press.
- Kentridge, R., Heywood, C.A. and Weiskrantz, L. [1999]: 'Attention without awareness in blindsight', *Proceedings of the Royal Society (London) Series B*, **266**, pp.1805-1811.

- Kentridge, R., Heywood, C. A. and Weiskrantz, L. [2004]: 'Spatial attention speeds discrimination without awareness in blindsight' *Neuropsychologia*, **42** pp.831-5.
- Kentridge, R., Nijober, T. C. W. and Heywood, C. A. [2008]: 'Attended but unseen: Visual attention is not sufficient for visual awareness', *Neuropsychologia*, **46** pp.831-69.
- Koralus, P. [2014]: 'The erotetic theory of attention: questions, focus, and distraction', *Mind and Language*, **29**, pp.26-50.
- Machery, E. [2009]: *Doing Without Concepts*. New York: Oxford University Press.
- Mayr, U. and Kleigl, R. [2000]: Task-set switching and long-term memory retrieval. *Journal of Experimental Psychology*, **26**, pp.1124-1140.
- Milner, D. and Goodale, M. [1995]: *The Visual Brain in Action*. Oxford: Oxford University Press.
- Mole, C. [2008]: 'Attention and consciousness', *Journal of Consciousness Studies*, **15** pp.86-104.
- Mole, C. [2011a]: *Attention is Cognitive Unison*. New York: Oxford University Press.
- Mole, C. [2011b]: 'The metaphysics of attention' In C. Mole, W. Wu, and D. Smithies, (eds.) *Attention: Philosophical and Psychological Essays*. New York: Oxford University Press.
- Mole, C. [2012]: 'Attention' In E. Margolis, R. Samuels and S. Stich (eds.) *The Oxford Handbook of Philosophy of Cognitive Science*. New York: Oxford University Press.
- Mole, C. [2014]: 'Attention to unseen objects' *Journal of Consciousness Studies*, **21**, pp.41-56.
- Mole, C., Wu, W. and Smithies, D. [2011]: 'Introduction' In C. Mole, W. Wu, and D. Smithies, (eds.) *Attention: Philosophical and Psychological Essays*. New York: Oxford University Press.
- Montemayor, C. and Haladjian, H. [2015]: *Consciousness, Attention and Conscious Attention*. Hong Kong: MIT Press.
- Norman, L.J.; Heywood, C.A. & Kentridge, R.W. [2013]: Object-based attention without awareness. *Psychological Science*, **24**, pp.836-843.
- O'Shaughnessy, B. [2002]: *Consciousness and the World*. New York: Oxford University Press.
- Posner, M. [1980]: 'Orienting of attention', *Quarterly Journal of Experimental Psychology*, **32**, pp.3-25.
- Posner, M. and Rothbart, M. [2007]: 'Research on attention networks as a model for the integration of psychological science.' *Annual Review of Psychology*, **58**, pp.1-23.
- Posner, M. and Rothbart, M. [2009]: 'Toward a physical basis of attention and self-regulation', *Physics of Life Reviews*, **6**, 103-120.
- Prinz, J. [2012]: *The Conscious Brain: How Attention Engenders Experience*. New York: Oxford University Press.
- Quervain, D., Roozendaal, B., Nitsch, R., McGaugh, J. and Hock, C. [2000]: 'Acute cortisone administration impairs retrieval of long-term declarative memory in humans', *Nature neuroscience*, **3**, 313-314
- Rothbart, M. and Posner, M. [2006]: 'Temperament, attention, and developmental psychopathology' In C. Cicchetti and D. Cohen (eds.) *Handbook of Developmental Psychopathology*. New York: Wiley.
- Rothbart, M. and Rueda, M. [2005]: 'The development of effortful control', In U. Mayr, E. Awh and S. Keele (eds.) *Developing individuality in the Human Brain*. Washington: American Psychological Association.
- Rueda, M., Fan, J., McCandliss, B., Halparin, J., Gruber, D., Lercari, L., Posner, M. [2004]: 'Development of attentional networks in childhood', *Neuropsychologia*, **42**, pp.1029-1040.
- Simonds, J., Kieras, J., Rueda, M., Rothbart, M. [2007]: 'Effortful control, executive attention, and emotional regulation in 7-10-year-old children.' *Cognitive Development*, **22**, pp.474-488.

Smithies, D. [2011]: Attention is rational access-consciousness. In C. Mole, W. Wu, and D. Smithies, (eds.) *Attention: Philosophical and Psychological Essays*. New York: Oxford University Press.

Styles, E. [1997]: *The Psychology of Attention*. Cornwall: Psychology Press.

Taylor, J. [2013]: 'Is attention necessary and sufficient for phenomenal consciousness?' *Journal of Consciousness Studies*, **20**, pp.173-194.

Taylor, J. [2015]: 'Against unifying accounts of attention', *Erkenntnis*, **80**, 39-56.

Treisman, A. [1996]: 'The binding problem', *Current Opinion in Neurobiology*, **6**, pp.171-178.

Treisman, A. and Gelade, G. [1980]: 'A feature-integration theory of attention', *Cognitive Psychology*, **12**, 97-136.

Vallone, D., Pignatelli, M., Grammatikopolous, G., Ruocco, L., Bozzi, Y., Westphal, H., Borrelli, E. and Sadile, A. [2002]: 'Activity, non-selective attention and emotionality in dopamine D2/D3 receptor knock out mice', *Behavioral Brain Research*, **130**, pp.141-148.

Watzl, S. [2011]: 'Attention as structuring the stream of consciousness', In C. Mole, W. Wu, and D. Smithies, (eds.) *Attention: Philosophical and Psychological Essays*. New York: Oxford University Press.

Wu, W. [2010]: 'What is conscious attention?' *Philosophy and Phenomenological Research*, **83**, pp.93-120.

Wu, W. [2011a]: 'Attention as selection for action', In C. Mole, W. Wu, and D. Smithies, (eds.) *Attention: Philosophical and Psychological Essays*. New York: Oxford University Press.

Wu, W. [2011b]: 'Confronting many-many problems: attention and agential control', *Noûs*, **45**, 50-76.

Wu, W. [2014]: *Attention*. New York: Routledge.