

PHENOMENAL SPECIFICITY



TONY H. Y. CHENG



Declaration I, Hwei-Ying Cheng, confirm that the work presented in this thesis is my own. Where information has been derived from other sources, I confirm that this has been indicated in the thesis.

A handwritten signature in cursive script, reading "Hwei-Ying Cheng".

Aug. 19th
2014

Abstract The essay is a study of phenomenal specificity. By ‘phenomenal’ here we mean conscious awareness, which needs to be cashed out in detail throughout the study. Intuitively, one dimension of phenomenology is along with specificity. For example it seems appropriate to say that one’s conscious awareness in the middle of the visual field is in some sense more specific than the awareness in the periphery under normal circumstances. However, it is difficult to characterise the nature of phenomenal specificity in an accurate way. This essay seeks to do just that.

In the introduction, I set up the discussion by invoking a threefold Campbellian framework. Chapter 1 introduces a key notion of the analogue, its roots in sciences, and its applications in philosophy. Chapter 2 focuses on the major case study – the Sperling iconic memory paradigm – and explains how the relevant notion of the analogue can be used to explain phenomenal specificity involved in the Sperling case. Chapter 3 discusses functions of attention, as it is a crucial element in the Sperling case. Chapter 4 extends the project by explaining how visual demonstratives fit into the present picture. Finally chapter 5 discusses several directions for future researches. This essay is not an attempt to discuss all the issues concerning the Sperling case, but to provide a new angle in seeing the issue: most people agree that visual phenomenology is in some sense specific, but there are not enough attempts to model phenomenal specificity explicitly. On this occasion we use a notion of the analogue and related ideas to understand phenomenal specificity and how it applies to certain empirical cases.

TABLE OF CONTENTS

Introduction The Campbellian Project

- 0.1 From the Imagistic to the Propositional —————5
- 0.2 From the Subliminal to the Phenomenal —————7
- 0.3 From the Doxastic to the Rational —————10

Ch.1 The Analogue Character of Vision

- 1.1 Information and Analogue in Sciences —————14
- 1.2 Analogue: Philosophical Accounts —————17
- 1.3 Peacocke on Analogue and Matching Profile —————22

Ch.2 Specific Phenomenology

- 2.1 Sperling's Partial Report Paradigm: A Case Study —————32
- 2.2 Block's Case for OVERFLOW and Its Critics —————38
- 2.3 Specific Phenomenology and the Analogue —————44

Ch.3 Attention: Selection, Access, and Modulation

- 3.1 Attention as Selection: Psychology —————50
- 3.2 Attention as Access: Philosophy —————52
- 3.3 Postdiction as Modulation —————57

Ch.4 Visual Demonstratives

- 4.1 Fixation and Peripheral Vision —————64
- 4.2 The Grain of Vision and Attention —————71
- 4.3 Fineness of Grain —————74

Conclusion The Road Ahead

- 5.1 Remaining Empirical Issues —————78
- 5.2 Analogue Magnitude and Supervaluation —————82
- 5.3 Rationality —————84

INTRODUCTION

The Campbellian Project

0.1 From the Imagistic to the Propositional

This essay is a study of phenomenal specificity in vision. When we see things, there is a sense in which at least some aspects of visual phenomenology or awareness are very specific: it is part of educated commonsense that we only see things in sharp resolution in a small region of the visual field, but still, the thought goes, within that limited region visual phenomenology should be highly specific. When one looks at a short word without spontaneously moving one's eyes, one should be able to tell what letters one is looking at, and perhaps what typeface is used (perhaps without being able to identify the name of the font in question). This essay seeks to provide a deeper understanding of this phenomenal specificity in vision.

This aim is embedded in a larger project of understanding visual knowledge; the Introduction provides an initial characterisation of that project and how the study of phenomenal specificity fits in. Vision is a form of perception. Visual knowledge is therefore a species of perceptual knowledge, 'which is the sort of knowledge that we get about the things around us by looking at them, feeling them, tasting them, and so on' (Dancy 1988: 1). With this simple characterisation, the notion of perceptual knowledge is neutral between two readings: under the first reading 'perceptual knowledge' refers to the state of perceiving itself, i.e., perceptual states themselves as knowledge; under the second reading, the notion refers to propositional attitudes that base

themselves upon perceptual states, i.e., beliefs formed from and warranted by perceptual states. Here the primary focus is the latter, and only about vision. In order to understand visual knowledge in this sense, the following elements need to be understood as well. First, we need to understand the relevant aspects of *vision*. Vision is so complicated that we have to restrict ourselves to the extent that the scope of study is narrow enough to be manageable but at the same time still informative enough for further theorising. For our purposes here, the two aspects we will need to focus on are the informational format of visual states, and how that affects awareness in vision. After this, we need to have a parallel investigation of *beliefs* that immediately derived from vision: we need to understand their informational format and how it affects awareness in beliefs. Given that the format of seeing and the format of believing are different in kind, or so I shall argue, an account of the *transition* from seeing to believing is called for. And finally, how the resulting beliefs can gain *entitlements* for their subjects is crucial for the claim of knowledge. These remarks are highly abstract. In order to be more concrete, I will set up the discussion by situating it into John Campbell's agenda, which involves three steps. Each section of this introduction corresponds to one step.

The first step is from the imagistic to the propositional. This is the transition from vision to belief. In his 'Sense, Reference and Selective Attention' (1997), Campbell writes:

The idea that there is a distinction between propositional and imagistic content is familiar and compelling, but it brings with it a problem. The problem is to explain the relation between the two types of content.
(55)

The idea is roughly this. It seem plausible, at least on the face of it, that vision's format is *imagistic*. In Campbell's formulation, what is imagistic in vision is its *content*. In the text he does not specify whether he means *representational* content as standardly understood in philosophy, but given that in the same context he talks about *propositional* content of beliefs, and propositional content is certainly representational, we can assume for the time being that he means representational content as well when he talks about imagistic content in vision.

However, in pursuing our project we can stay neutral about the issue whether vision involves representational content. Even if the answer is negative, there can still be two interesting senses in which vision is imagistic. First, vision understood as information processing can be imagistic in that the format of information is imagistic. The first half of Chapter 1 will be an attempt to cash out this idea. Secondly, vision's phenomenal aspect can be imagistic as well. The second half of Chapter 1 and then Chapter 2 will pursue this idea further. Now, no matter which sense of imagistic we have in mind, it should be clear that many beliefs, unlike vision, are not imagistic. Instead, it is often claimed that they have *propositional* structure. There has been different ways proposed by philosophers to understand this structure. In Campbell's own understanding, this kind of content 'is content with subject-predicate structure, in which general terms are coupled with singular terms' (ibid., 56). This is a version of *Fregean* conception of proposition (Burge 1991). Competing theories include Russellian conception that takes properties and objects and constituents of content (Tye 1995, 2000), and possible-world conception that uses a set of possible worlds to understand propositional content (Stalnaker 1984, Lewis 1986). We do not take side at this point. What is crucial for us here is to recognise that no matter how we understand proposition, it looks very different from imagistic content or information. So far we have not provided any argument to the effect that being imagistic is incompatible with being propositional, but at least on the face of it they seem to have very different properties. Hence the challenge.¹

Campbell's own solution to this challenge 'is [to argue] that the primary mechanism for mediating between propositional and imagistic content is perceptual *attention*' (55; my emphasis). I agree with this general view, and will pursue it in Chapter 3. Now I turn to the second step of the Campbellian agenda.

0.2 From the Subliminal to the Phenomenal

¹ Some philosophers have discussed the possibility of thinking with images, for example Michael Ayers's book on Locke (1993) and Peter Geach's discussion of Wittgenstein (1957). We should not deny that sometimes we think with images, for example when we try to figure

Above I alluded to the two senses in which vision can be imagistic. Both senses are very important for anyone who wants to have a thoroughgoing understanding of vision because the subliminal information processing aspect of vision is what sustains our visual cognitive abilities, and because the phenomenal aspect of vision is so essential to our mental lives. Vision science by and large concerns the former, while philosophical views about vision mostly concern the latter. Now there can be two competing conceptions of how science and philosophy interact here. On the one hand, we have Campbell's rather optimistic view, which is nicely captured by M. G. F. Martin:

[Campbell] suggests a way in which we can understand our experience of the world not simply as a consequence of such information processing, but really *constituted out of* it. (1997: 76; my emphasis)

On the other hand, we have Martin's own pessimistic view that 'it is difficult to see how we can move beyond the shallow conception of experience we can form through introspection and find it in the structures that Campbell draws from cognitive psychology' (ibid.: 76-7). In a way, this essay can be understood as a partial answer to this question, namely: how do information and phenomenology fit together? The fuller shape of it will be clearer in due course. For now let's stay neutral between these two views, and I shall now explain the distinction between subliminal and phenomenal perception.

The distinction between subliminal and phenomenal or conscious perception is a well-established one in psychology. In most cases philosophers agree with it too.² Often cited evidence includes masked priming, residual discrimination in blindsight, and so on. In the case of priming, although participants would only be aware of the target, not the earlier stimulus, that earlier stimulus would nevertheless guide participants' decisions. For example, if the task is colour detection, when the earlier stimulus is congruent with the target, it facilitates the responses (i.e., reaction time becomes shorter). With blindsight patients, we can press them to give answers with forced choice paradigm with certain kind of targets (i.e., colours might not be appropriate in most cases). In these cases, some might want to argue that given their

² For an exception, see Phillips (in preparation).

definition of perception, masked priming and/or blindsight do not qualify as perception. For example, if one holds that perception must exemplify a certain sort of constancy (Burge 2010), then perhaps masked priming and blindsight would not qualify as perception, even subliminal perception, since in these cases participants' access to targets are too weak or not robust enough in some sense. Here I will not propose a definition of perception myself, and I am not going to argue against any definition from others. If given certain definition masked priming, blindsight, and other cases do not count as perception, call them *registration* or other deflationary names. The overall argumentation in what follows would not hinge on the idea that in masked priming and so on we are entitled to say that genuine perceptions are going on.

Even apart from whether we can say that blindsight is a form of perception, we can ask a related question in this case, namely 'about the role of consciousness in our psychological lives' (Campbell 2004: 265). Campbell first identifies a very strong view: 'the results from neuropsychological cases seem to show people finding out their surroundings on the basis of perception, and moving and acting successfully in their environments, *without the benefit of experience of their surroundings*' (ibid.: 265). This seems to be too strong because in cases such as blindsight what patients can do through those perceptions (if any) is very limited. Maybe in hypothetical cases such as 'superblindsight' (Block 1995a), in which subjects can readily prompt themselves to act on sparse information they gather, we can derive stronger conclusions like the current one, but real pathological cases fall short of those outlandish outcomes. By contrast, there is another view that he calls the 'how-to-do-it' conception, on which

[I]t is *experience* of the world that makes it possible for us to have knowledge of our surroundings, and to move and act in the world. On this picture, if you want to catch a cricket ball, for example, all the information you need to do that – the direction and distance of the ball, how fast it is moving, and so on – are provided in the content of your *conscious* experience. (Campbell 2004: 265).

I find it easier to simply call this the ‘commonsense picture,’ and Campbell agrees with that this view is a commonsensical one, though he believes it is false. He also believes that the strong, revisionary view he derives from the blindsight case is incorrect; he uses these two incorrect views (by his light) to set up the dialectic, and provides his own alternative. We will revisit this issue in later chapters, for example when we discuss David Rosenthal’s view on rationality and consciousness (2008). For now I just want to emphasise that there are issues we need to deal with concerning the distinction between the subliminal and the phenomenal, and cases such as blindsight might help at certain points.

0.3 From the Doxastic to the Rational

The third step in this Campbellian project concerns the transition from belief, a paradigmatic doxastic state, to knowledge. The relation between belief and knowledge has proven to be much more complicated than many of us think because of Gettier cases and various responses to it. On this occasion I do not ambitiously aim at contributing to this thorny problem. What I need is this minimal claim: *entitlement* is required by the claim of knowledge. Entitlement is a manifestation of rationality, and it is a crucial component of knowledge. This claim is silent about whether we can decompose knowledge into belief and other elements, or whether we should take belief to be more primary/primitive than knowledge in our theories. What we only need is the idea that belief formation itself is not enough for knowledge; after all, it is *belief* formation, not *knowledge* formation. In order to form knowledge, we need some more elements; more specifically, some *rational* elements.

Campbell recently (2011) takes up this issue by revisiting a distinction he made in *Reference and Consciousness* (2002), the distinction between *selection* and *access*. He points out that in recent philosophical literature many have tied attention to access (2011: 323), while he wants to ‘draw a distinction between two different aspects of attention and between two different roles a perceived property can play in attention’ (ibid.: 323-4). His conceptual resources have always been Anne Treisman’s feature map theory (1988), but in this recent paper he situates his view in another framework, the one provided by the Boolean map theory by Liqiang Huang and Hal Pashler (2007). *Pace* Huang and

Pashler, however, Campbell argues that ‘we should connect visual experience, rather, to the properties on the basis of which regions or objects are *selected*’ (2011: 329; my emphasis). We will revisit this view in Chapter 3. In this section my purpose is to illustrate how this discussion bears on rationality and knowledge.

To make this link, the crucial notion is ‘access.’ Campbell here uses the definition from Huang and Pashler. He rephrases it like this:

[Access is] a matter of attaching ‘feature labels’ to the selected (possibly discontinuous) region. Access and labeling are the same thing; to access a feature of a region is to label that dimension (color, shape or whatever) of the region. (ibid.: 327)

To illustrate this notion of access and its contrast with selection, Campbell elaborates this following example:

Consider a child, at this stage of development [2-year old], looking at the kind of display often used to test for color-blindness – a green 5, say, showing against a background of red blobs, with the blobs constituting the 5 differing randomly from each other and from the blobs constituting the background in luminance, in shape, and in every other characteristic except hue...If the child does have ordinary color vision, then the 5 will be plainly perceptible. (ibid.: 331)

Now the crucial point is that ‘[w]hether the child can see the 5 is one thing. Whether the child is able to access the color of the object is another’ (ibid.: 331). This is because the child may have no relevant colour vocabularies, and therefore cannot make inferences about colours. Now, this looks very similar to Ned Block’s definition of access that involves ‘direct rational control of action and speech’ (1995a/2007a: 168). This rationalist line of definition is helpful for the purpose here because in order to take it as a bridge to knowledge, it has to be substantively related to rationality. As Block emphasises, ‘there are many notions of [access or accessibility] with utility for different purposes’ (1995b/2007a: 238). For the purpose of epistemology, we

need one that involves rationality, though we should acknowledge that other notions of access could be stipulated for other theoretical purposes. Campbell also notes this point by saying that others can have a deflationary notion of access defined in terms of information reception (2011: 332), but in order to do the epistemic work we have in mind, something like Campbell's or Block's definition is more apt.³

In making this distinction, Campbell (like Block) dissociates experiences from access in the sense we introduced above, and therefore needs to explain how experiences can play any rational role at all in knowledge formation. I shall briefly return to this in Chapter 4 and Conclusion. In this section I just aim at setting up the discussion with the Campbellian agenda. Now before ending the Introduction, I would like to make a methodological remark. Despite the fact that I have set up this discussion with Campbell's framework, and I will return to his positive account in details in due course, this essay is not a contribution to Campbell scholarship. I invoke his framework because it nicely highlights most crucial elements in the larger project I am interested in; that is, visual knowledge. In gaining visual knowledge, vision and visual experience need to be in place first. They seem to be imagistic in format. If so, we need to explain the nature of this format, and how it relates the other format that governs beliefs. There is a related question concerning the relation between vision and visual experience, so we need to understand the distinction between the subliminal and the phenomenal. Finally, when we have relevant visual beliefs in place, we still need to account for a further rational element that makes belief knowledge. This is where the notion of access comes in. This overall territory constitutes the larger project in the background. Campbell's works from the 90s cover this ground in a comprehensive way. In what follows I will discuss his view, and when needed, disagree with it. But the purpose is not to provide a review of his philosophy. Along the way other thinkers' ideas will be discussed when appropriate, but the overall aim of this study is to understand the nature of phenomenal specificity

³ In a previous draft of this material, I invoked a much weaker notion of access that is similar to what Campbell means by 'selection.' Paul Snowdon reminds me that if I want the notion I am using to provide the link to epistemology, I need something much stronger than that. As a result the notion provided by Campbell and by Block proves to be useful. Also, in this way my usage of the term is closer to the orthodoxy usage, which facilitates communication as well.

as an element of visual knowledge, not a thoroughgoing study of certain thinker's views.

Finally, let me provide an overview of this essay. In this introduction I have reconstructed a framework from some of Campbell's works. In the main body of this essay I will discuss some cases that help us understand phenomenal specificity, but the classic Sperling partial report iconic memory paradigm (1960) will be central. This case will be introduced in Chapter 2. Some preparatory works for understanding it will be offered in Chapter 1, where I will discuss notions of the analogue and use one of them, developed from Christopher Peacocke (1986, 1989), to cash out the imagistic nature of vision. In the Sperling paradigm the key is to understand the relation between visual phenomenology, on the one hand, and attention, on the other. Chapter 1 and 2 will be my attempt to understand the former, while Chapter 3 is devoted to the latter. Chapter 4 explores related issues concerning visual demonstratives and the grain of vision. In the Conclusion I tight up some loose ends and discuss some future directions. In omitting many details in this overview, I hope the general scaffolding is clear and sensible.

CHAPTER 1

The Analogue Character of Vision

1.1 Information and Analogue in Sciences

In the previous chapter, I introduced the idea that from vision to visual knowledge there are several transitions. The first one is from the imagistic to the propositional. The imagistic refers to the idea that at least on the face of it, vision and visual awareness present us the scene in imagistic ways.⁴ This chapter is an attempt to elaborate the sense in which vision and visual experience are imagistic. What really concerns us, however, is visual *experience*. In Chapter 2 we will invoke the material here to investigate the nature of phenomenal specificity in vision. For now, what is crucial here is *a* notion of the analogue: this is only *a* notion, since like ‘access’ or perhaps many vocabularies in theorising, it is not realistic to claim that one’s notion is *the* notion. At most, one may claim that one notion is *the* notion to adopt given a specific purpose. But even that might be too strong, since with a specific purpose maybe more than one notion of the analogue (say) are helpful. In any case, here I will rely on a notion of the analogue introduced by Christopher Peacocke (1986, 1989). That said, other notions of the analogue are related, and it is helpful to understand their roots so that we can have a better grip of

⁴ Here I talk about both vision and visual experience, which involves another transition. One might argue that since I say ‘on the face of it,’ in this context I must be referring to phenomenological reflection, but if so I am entitled only to talk about visual *experience* in this way. However, I do mean to include subliminal vision in this context. This is because we can also say that unconscious vision is, on the face of it, imagistic from the point of view of artificial intelligence: if one is building a simple robot which will presumably not be conscious, one would still do this by implementing imagistic representations.

the discussion. In this section I discuss just very briefly some preliminary understandings of the analogue and relatedly information in sciences, and move to the philosophical literature on them in section 2. Finally I will discuss Peacocke's notion and relate it to the overall project here in section 3.

'Analogue' in this context is a way of coding *information*. Information has become a crucial notion in many domains, and it is hard to find a single, satisfying definition of it. For our purposes, it is instructive to look at some account that aims at a comprehensive understanding of information. According to Juan Roederer (2003), the most striking property of information is 'to cause specific changes in the structure and energy flows of a complex system, without the information in itself representing fields, forces or energy in any of their characteristic forms' (3). But information does not confine itself within the physical realm. It also plays critical roles in biology and Darwinian evolution. It further goes up to the psychological realm. In computer science, information consists of data understood syntactically, for example the 0s and 1s in many programmes. So understood, data can be encoded, stored, processed, and transmitted. Amongst data, there can be two formats that are different in kind. Standardly, *analogue* data vary continuously, while digital data vary *discretely*. This way of understanding the analogue/digital distinction has been challenged by some works in philosophy, which will be considered in section 2. Here I tentatively work with this initial understanding. A classic statement of this idea is from Alan Turing:

The digital computers...may be classified amongst the 'discrete state machines.' These are the machines which move by sudden jumps or clicks from one quite definite state to another. These states are sufficiently different for the possibility of confusion between them to be ignored. Strictly speaking there are no such machines. Everything really moves continuously. But there are many kinds of machine, which can profitably be *thought of* as being discrete state machines. (Turing 1950: 439)

The Turing machine itself, as a logically idealised model of normal personal computers, is a digital computer. Digital data are *binary* because they are

typically encoded by only two symbols, for example 0s and 1s. Analogue computation, by contrast, operates in real time, and often process in *imprecise* ways. From this we can see the initial motivation of using the analogue to understand vision and visual experience, which are imprecise by their very nature. More about this will be discussed when we move to Peacocke in section 3. Before moving on, I discuss how the notion of information has been used in psychology.

Around the time Turing was writing, the concept of information arose from communication theory (Shannon and Weaver 1949). It is a mathematical or quantitative notion in that signals can carry different amounts of information. To understand more about it, we need the notion of uncertainty. When one tosses a coin, the statement ‘it will be either heads or tails’ is uninformative because the knowledge of this statement does not reduce the uncertainty concerning what would happen concerning this coin (Fitts and Posner 1973). The degree of uncertainty negatively correlates with the amount of potential information. If we know that it would be heads, the degree of uncertainty is greatly reduced and we gain substantive information. Subsequently, psychologists such as Donald Broadbent take themselves as understanding the transmission of information in the nervous system. When a stimulus always gives rise to the same response, we can say that information is maximal. Under this circumstance, there is no uncertainty between the input (i.e., stimulus) and the output (i.e., the report). When there are different responses, the amount of information is reduced. The amount of information can be calculated with factors such as response time. The main strength of this approach is that information is something measurable and therefore suitable for scientific theorising.

The next step is to introduce the notion of redundancy. When we do not have maximum information, there is redundancy in the case. Redundancy is also negatively correlates with the amount of information. Broadbent (1958) further elaborates these ideas into his ‘filter theory.’ This theory has been seriously challenged by later accounts, for example the one offered by Broadbent’s student Anne Treisman (1960), but for our purposes the further development of specific theory is less relevant. What we need is the basic idea about how information works in theorising about cognitive systems. The

following two sections depart from the basic idea introduced above and offer a specific understanding of analogue information.

1.2 Analogue: Philosophical Accounts

In philosophy, there are two strands in understanding the distinction between the digital and the analogue. Let's start with the one that is more in line with the above discussion. The representative of this view is from Nelson Goodman:

Plainly, a digital system has nothing special to do with digits, or an analog system with analogy...Since the misleading traditional terms 'analog' and 'digital' are unlikely to be discarded, perhaps the best course is to try to dissociate them from analogy and digits and a good deal of loose talk, and distinguish them in terms of *density* and *differentiation* – though these are not opposites. (1968: 160; my emphasis)

This is similar to the understanding in section 1 because 'differentiated' roughly means 'discrete.' Even nowadays this understanding is still dominant in computer science; for example in 'analogue electronics' people use analogue to refer to electronic systems that are analysed with continuous variables. Goodman usefully explains his view by saying that 'digital' and 'analogue' in his usage should *not* be taken to be connected to their cognates 'digit' and 'analogy.' As we will see presently, this clearly marks the difference between this view and its opponent.⁵

David Lewis (1971) offers an alternative account that '[takes] issue with the claim that digital systems have nothing to do with digits, and that analog systems have nothing to do with analogy' (Maley 2010: 119). In this sense, this view is closer to another root of the analogue/digital distinction, the one from cognitive science on mental imagery. In this debate, the crucial disagreement is about whether mental imagery and rotation are analogue or propositional (Pylyshyn 1981; Kosslyn 1981). This should remind us of the first transition in the Campbellian agenda, i.e., from the imagistic to the propositional, which we are investigating at this stage. So at least for this reason, this second tradition

⁵ John Haugeland (1981) offers another version in this vein.

fits our purpose better. Recently Corey Maley (2011) proposes a more ambitious project that seeks to unify the two understandings for his purpose; here my aim is much more moderate. What I need here is an understanding that helps us model vision and visual experience. Below are some general understanding of the distinction between the analogue and the digital in terms of digit and analogy.

In this line of thought, to say that we can use A as an analogue device to measure B is to say that we invoke an *analogy* between A and B. Any analogy is to draw similarity comparison along certain dimension; consider the example in which we use a bar to measure the width of a window. When the bar we are using is longer than the width of the window, we make a mark on the bar where the window ends. In doing this we do not use any *unit*: nothing like inch or centimeter is involved. But if we want to make the measurement easier to communicate, we may introduce units in the bar. Thus the bar becomes a ruler, a *digital* device. It is digital because we can use it to ask discrete yes/no questions, for example whether the width of the window is 20 inches or not. This brings us to a related idea from Peacocke that we see things in a *unit-free* way (1986: 2; 1989: 300): we do not see things with units such as inches and centimeters. To be sure, this phenomenological point cannot rule out the possibility that we do see things with *mental* units without being aware of them, but at least it provides a *prima facie* reason to start with the assumption that seeing is unit-free. Again I postpone my discussion of Peacocke until section 3.

One way to understand the significance of all these is the following. It seems relatively unproblematic to say that beliefs are *digital*, because we evaluate them with *truth*, which is binary under normal understanding. Vagueness aside, beliefs are like assertion in that they can be true or false but no third value. Sometimes we say an assertion is roughly or approximately true, but that means that it is strictly speaking false. For example when we check time we say 'it's five past noon,' but very often it is strictly speaking false, even in cases that the clock is accurate. Assuming this is the correct way to understand belief, then there is a question about whether we should model perception, in our case vision, in the same way. But here we have pressure from both sides. On the one hand, in order to account for the rational linkages between seeing and believing, it seems easier if seeing is digital as well; on the

other hand, there are other reasons, notably phenomenological ones, that lead us to think that seeing is analogue. For those who holds any kind of analogue account, one needs to explain more about this analogue nature and how it can accommodate the rational linkages between seeing and believing. Another challenge is to explain how we can present determinant length/interval *without using units*. To this Peacocke's solution is to introduce what he calls 'manner' (1986: 5; 1989: 303). Notice that since 'digital' in this context is a *semantic* notion as it is related to truth, correspondingly 'analogue' here should be understood in semantic terms as well. Here again we depart from the definition prominent in computer science, where the distinction between the analogue and the digital is a syntactic one.

Before turning to Peacocke, it would be very helpful to discuss Fred Dretske's discussion of relevant matter. In *Knowledge and the Flow of information* (1981), Dretske takes up virtually all the challenges we set up in the introduction. He has an understanding of the analogue/digital distinction that is designed to account for the transition from the imagistic to the propositional. He also provides an account of belief and knowledge that corresponds to the transition from the doxastic to the rational. Although the transition from the subliminal to the phenomenal is less obvious in this work, he comes back to it in his more recent works (e.g., 2006). Just like our discussion of Campbell, this essay is not supposed to be a contribution to Dretske (or any other philosophers) scholarship; it instead seeks to aid our understanding by discussing their ideas sometimes in details, sometimes with broader outlooks.

Dretske starts by distancing himself from the first strand in understanding the analogue/digital distinction; that is, 'to think of the difference between an analog and a digital encoding of information as the difference between a *continuous* and a *discrete* representation of some variable property at the source' (1981: 135-6; my emphasis). Like the discussion above, he does not argue against this strand of understanding; he provides a different understanding because it fits the purpose of understanding the transition from the imagistic to the propositional (in my terms). His definition is this:

I will say that a signal (structure, event, state) carries the information that s is F in *digital* form if and only if the signal carries no additional

information about *s*, no information that is not already nested in *s*'s being *F*. If the signal *does* carry additional information about *s*, information that is *not* nested in *s*'s being *F*, then I shall say that the signal carries this information in analog form. (ibid.: 137)

Take Dretske's own example. Suppose we have a statement saying that 'the cup has coffee in it'; this statement by itself does not communicate how much coffee there is in that cup, or how the cup looks like. This is why statement is said to be encoded in digital form. By contrast, if we take a photograph of the situation, the information about the quantity of coffee and the properties of the cup will be included as well, even though that might not be the purpose of that specific communication. This example also shows the relevance of this understanding of the analogue/digital distinction to the transition from the imagistic to the propositional: it is no accident that the example involves a statement and a photograph; their difference is exactly what Dretske attempts to capture here.

Let's proceed to see how Dretske invokes this pair of notions to account for the transition from the imagistic to the digital. Again with use Dretske's own example. He invites us to 'consider the following simple mechanism':

A variable source is capable of assuming 100 different values. Information about this source is fed into an information-processing system. The first stage of this system contains a device that accurately registers the state of the source. The reader may think of the source as the speed of a vehicle (capable of going from 0 to 99 mph), and the first stage of our information-processing system as a speedometer capable of registering (in its mobile pointer) the vehicle's speed. This information is then fed into a converter. The converter consists of four differently pitched tones, and a mechanism for activating these different tones. If the source is in the range 0 to 14, the lowest-pitched tone is heard. A higher-pitched tone occurs in the range 15 to 24, a still higher pitch from 25 to 49, and the highest at 50 to 99. (1981: 139-40)

This mechanism can be represented with this figure:

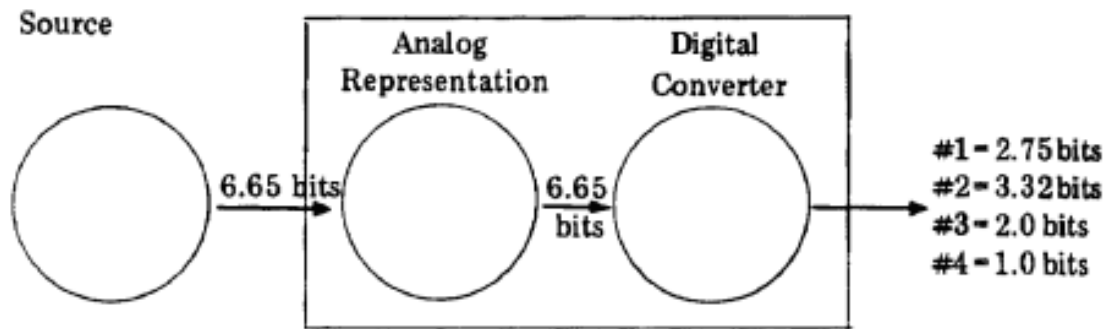


Figure 1. From Dretske 1981

First thing to be noted is that at the first stage it involves several ranges; that is because at a later stage those ranges would correspond to individual signals, in this case different pitches. As Dretske points out, there would always be loss of information (ibid.: 140-1). Consider again the photograph and the statement. When we have the photograph before us, we can write several statements about it. Every statement picks out a specific aspect of the photograph, e.g., the fact that there is coffee in the cup, the quantity of coffee, the colour of the cup, and so on. We can of course use conjunctions to connect individual statements so that in the end the information encoded in the long statement is almost as much as the information encoded in the photograph. But here we need to note two points. First, even assuming that *quantitatively* speaking, the information carried by the long statement is exactly the same as the information carried by the photograph, the *formats* are still different: in the photograph, parts of it draw similarity comparison along certain dimension with the scene, while in the long statements we have to use different components, notably *conjunctions*. Secondly, since we are using this model to understand seeing and believing, we should remind ourselves that realistically beliefs never involve too many conjunctions. What we are modeling are human psychological states, so what we say here has to be psychologically real. Even apart from the first problem, realistically speaking the outputs, i.e., beliefs, would definitely loss information. This is the nature of the transition from the imagistic to the propositional. Dretske's model gives us a good starting point in this project.

However, there are at least two reasons to move beyond Dretske's picture. First, consider this objection from Peacocke:

[H]is actual definition of the distinction, however, relates not to the form in which the information is carried, but to the degree of specificity of the information carried by a state relative to the most specific information carried by the state...Dretske's definition captures neither a distinctive type of content, nor a distinctive type of form in which the information is carried. (1989: 315)

Peacocke's objection seems to be this. What we want to capture about the distinction between the digital and the analogue is their difference in format, but what Dretske's offers does not succeed in doing this. Instead, it points to the *degree* of specificity. This is unsatisfying because the digital and the analogue should constitute a dichotomy, which is exactly not a *gradational* notion. Consider this following example. Newspapers should be understood as conveying information in the digital form (unlike photos), but with Dretske's definition it might be able to conceive newspapers as an analogue device, since newspapers' reports can sometimes carry additional information about the target. So even if Dretske's relevant discussion is insightful, the definition itself is not satisfying.

Secondly, in his example involving the photograph, Dretske does not directly discuss vision and especially visual *experience*. This is not his project in that particular work (1981). This brings us to Peacocke's work, which explicitly sets itself to characterise vision and visual experience when using the distinction between the analogue and the digital.

1.3 Peacocke on Analogue and Matching Profile

Peacocke's works on analogue content in the 80s are seldom discussed by other philosophers. This is so not only because it is conceptually very dense, but also due to the fact that it was soon replaced by a similar and related debate, i.e., the one between nonconceptual and conceptual content. We should not, however, conflate these two issues, for the simple reason that the distinction between the analogue and the digital does not map onto the

distinction between the nonconceptual and the conceptual: digital computers are not *conceptual* devices, unless one has a fancy conception of the conceptual, for example. Perhaps most philosophers do not commit to this conflation, but in any case the earlier discussion of the analogue and the digital is largely forgotten from the 90s until now. Even Peacocke himself puts more emphasis on nonconceptual content in *A Study of Concept* (1992), shortly after his elaborates an account of analogue in 1989. To be fair, even in the 80s Peacocke has already discussed nonconceptual content, but at least as a sociological fact the discussion of the analogue almost disappears in the literature from the 90s. In any case, in what follows I will revisit and develop his account in the 80s and try to show that the account provides us a good direction towards understanding the nature of vision and visual experience.

Peacocke's theorisation proceeds on the assumption that perceptual states exemplify *representational content*. For example he says at the beginning of the chapter on perceptual concepts in *A Study of Concepts*: 'A perceptual experience *represents* the world as being a certain way' (1992: 61; my emphasis). Similar starting point is operative in earlier works (1986, 1989). For our purposes we can abstract this assumption away. To see how this is possible, consider how psychologists understand the following notions in this area – just noticeable difference, discriminability, and visual acuity. When they conduct experiments and write discussions on them, there is no need to assume representational content in philosopher's sense. Notions of representation do flow around in psychology, but none of them is obviously identical to philosopher's usage. To be sure, there is a possibility that when we remove the assumption we might lose what Peacocke means at some point, but as an initial move it seems fine given that the subject matters do not obviously hinge on the idea that perceptual states exemplify representational content.

But even if my readers allow me to do so, there would be an immediate query: if we bracket the representational assumption, where should we start instead? More specifically, Peacocke argues that perceptual experiences are in a certain way *analogue*, and with the representational assumption he can readily substantiate the claim by saying that 'these [analogue] manners of perception constitute a genuine level of *content* in their own right' (1989: 306; my emphasis). If I abstract away the representational assumption, how can I further cash out

the claim? What is the property of perception, if not content, that is analogue? Here I propose that the property in question is *phenomenal character* or more generally, *phenomenology*. I will offer two reasons for this.

First, consider this line of thought. When two lines are almost the same length, average human subjects cannot *discriminate* between them with respect to length. When we adjust the setting, in the present case the lengths, so that now average human subjects are able to discriminate them concerning their lengths, it means that the length difference between them reaches *just noticeable difference*. This is a fact about our *visual acuity*, which admits of individual differences. Now, it is arguable that in this kind of tasks, average human subjects might draw on visual *phenomenology* to achieve the tasks, or at least, the discriminatory capacities *shows up* sometimes to inform us what is going on. This is consistent with the possibility that a phenomenal zombie can have the same cognitive achievement without drawing on any phenomenology – like an unconscious machine, the zombie can have visual acuity to certain stimuli and thereby discriminate between them. However, this consistency does not imply that in the case of average human subjects, i.e., ourselves, phenomenology is not part of the story in visual acuity tasks; at least, it plays certain (if not crucial) role. Or consider a more vivid case of colour phenomenal continuum. Colour *a* is indiscriminable from *a'*, and *a'* is indiscriminable from *a''*, but *a* is discriminable from *a''*. In doing this, we might draw on our visual phenomenology to achieve the tasks, or at least discriminative capacities *show up* in phenomenology. Again an unconscious machine can do this without any phenomenology, but this is not relevant. We are interested in our own case, and it is arguable that in our case phenomenology plays certain (if not crucial) role in achieving these cognitive tasks. Even if we assume epiphenomenalism, at least we can say that discrimination *manifests* in phenomenology sometimes.

Secondly, the idea that phenomenology is actually what is at issue fits well with Peacocke's text. At one point he says, '[i]ndividuation of the content of perception is answerable to considerations of *phenomenology* in the first instance' (1986: 12; my emphasis). The reason why he concludes that one sort of perceptual content is analogue is this above conviction concerning the relation between phenomenological considerations and content individuation. The main body of his relevant works is all about visual phenomenology,

broadly construed. The transition from the phenomenal to the representational is not his main point in those works.

In redirecting Peacocke's discussion like this, we touch on the second transition in the Campbellian agenda, the one from the subliminal to the phenomenal. Here we face a difficult question whether our view would collapse into epiphenomenalism, as alluded above, or whether we should insist on the causal efficacy of experience, and if so, how. These difficult issues will be discussed in later chapters. For now we only need to note that even if we concede that phenomenology *might* be epiphenomenal, at least it is indeed a salient part of human mental life (though without relevant causal powers).

What do we mean by 'phenomenology' then? This is another difficult question that can itself be a thesis topic, but since it is one of the central notions here, let me make some preliminary comments. In this area, there are terminologies that look like they can be used interchangeably but actually not. For example, 'phenomenality' (Siewert 1998, 2012) implies that it is a property ('ity'), while some philosophers might argue that the experiential aspect of vision should be treated as particulars (repeatable) or events (non-repeatable), and so on. I intend to use the term 'phenomenology' to stay neutral between these competing views. One ambiguity is that the word can also be used to refer to a branch in philosophy: just like 'psychology,' in some cases it means individual's mental life, but in other cases a discipline. However, given the present context, it should be very clear that we do not use the term to refer to that branch of philosophy. We are talking about an element of the mind, be it property, particular, or event.

Philosophers very often talk about this aspect of the mind with the phrase 'what it is like for a creature to undergo' a mental state or episode (Nagel 1974). However, in recent year some have pointed out that the phrase does not do the theoretical work we want it to do (Williamson 1990/2013). Paul Snowdon (2010) has argued that the phrase is not necessary, nor sufficient, and not even very informative in picking out our subject matter. I am sympathetic with this sceptical line, but want to make a weaker conclusion that we can carry on using the terminology as long as we remind ourselves that it does not do significant theoretical work for us. It serves as a (defective) way to get people's attention to the phenomenon, but by itself it is not descriptively

satisfactory. In what follows we may or may not use the phrase, but even when we use it we should treat it from a deflationary point of view.

These are only general remarks and qualifications. Let's go back to Peacocke and follow his line of thought more closely so that we can get a better understanding of the details. For the ease of exposition, I here follow his shorter paper in 1986.

In both essays, Peacocke starts with daily examples showing the contrast between thinking about length with units like inch and simply seeing length. Historical accuracy aside, this is similar to Russell's distinction between knowledge by description and by acquaintance. Here Peacocke mainly relies on phenomenological considerations in pushing his point: 'the notion of distance in *feet* ought not to enter a specification of the content of his experience at all' (1986: 2). This is a phenomenological point because before and after this remark there is no explicit argument supporting this conclusion. And I concur in this view: even if we see in mental units unconsciously, this does not affect the point that from perceiver's point of view, she simply sees length without unit. This consideration leads Peacocke to claim (and I agree) that seeing is unit-free.

However, as he himself points out, to say seeing is unit-free, by itself, does not help us answer the questions he sets out to answer, namely: 'questions about the correct formulation of these ways [of seeing], their individuation, their internal relations to one another, and what distinguishes them as a class' (ibid.: 2). Before he starts the positive account, he guards against a proposal that invokes 'precise distance experienced' to account for our ways of seeing (ibid.: 3). The reason to deny this is simply because 'humans do not have arbitrary powerful senses' (ibid.: 3).⁶ This echoes the idea in section 1 that analogue is *imprecise*. He then uses notions such as 'discriminability' and 'matching' (non-discriminable difference) to make the argument more explicit. For our purposes I do not enter this negative use of these notions here. However the positive use is crucial: they help us construct a notion of 'matching profile': for direction, the 'matching profile is a set of directions: a given direction is in the set if and only if it is not discriminably

⁶In initiating his anti-luminosity argument, Timothy Williamson has a similar starting point: 'our powers of discrimination are limited' (2000: 13).

outside the apparent direction of the end of the perceived arm' (ibid.: 4). Similar things can be said about distance, length, and other visible properties. The notion of matching profile can capture the 'subject's perceptual acuity' (ibid.: 4). Matching profile can accommodate the fact that humans' powers of discriminatory capacities are limited, and relatedly, it can help explain veridicality (ibid.: 5): an experience being veridical is a matter of degree. If we were to require perfect correspondence between objects' properties and what is presented in experience, then almost no visual experience can be veridical. The idea of matching profile takes non-discriminable difference into consideration. One way to think about matching profile is to say that it is a set that specifies how the world could be given that experience. There are many ways the world could be that are compatible with one's current experience.

In order to understand the core of this proposal, we need to focus on the contrast between *binary* valuation and *supervaluation*. If experience admits of binary valuation, then there are two possibilities. Either the world is presented in experiences as having absolutely determinate lengths, sizes and so on, and the experience is veridical only when that very length or size is present, or the world is presented in experiences as falling within some intervals with respect to length, size and so on, and experiences present the interval in question as exemplified; again here experiences are perfectly veridical or not. There is no immediate contradiction within this picture, i.e., the world as presented in experiences with binary valuation, but it seems to be in tension with a plausible idea that veridicality is a *gradational* notion. Our experiences are so fleeting that if we impose such a strong requirement of veridicality, most of our experiences would turn out to be non-veridical, and this is what we should deny. This reply is different from a bad reply to scepticism: it is useless to say to the sceptic that if your view is correct, then most if not all of our experiences are non-veridical. To this the sceptic could simply reply that if that is so, so much the worse for us. My reply here is in a better position because in the present context, scepticism is out of question. We are assuming the daily conception of the world that external world exists independent of being perceived, etc. On this basis, we ask the question as to how to understand experiences' veridicality. In this context, 'veridicality' is a term we use to refer to *usual* cases of perception. It is almost a semantic point that most experiences are veridical. If this line of

thought is correct, then when a view entails the opposite, we then have at least one reason to cast doubt on that view.

If we drop the idea that binary valuation can capture experiences, supervalueation presents itself as a natural alternative. Here we consider a number of different ways of presenting, each involving lengths that fall below *just noticeable difference*, and we consider the experience to be presenting some property only if each of the ways of presenting are consistent with that property. This is where the idea of ‘matching profile’ comes in. It allows for the idea that there is something of a degree to the accuracy of experience. Also consider the following three cases: experience two lengths as the same, experience them *not as different*, and experience them as different. The middle, intermediate case is a common phenomenon that needs to be understood. The analogue model here can do the work. If within a given matching profile, then one experiences two lengths as the same. If we keep making the objective difference bigger, towards a certain point they would reach the boundary of matching profile, and at this point one would experience them not as the same but also not as different. Subjects are unsure in this case. This is analogous to the case of vagueness – say at some point one would be unsure about whether a case constitutes a heap or not – and that is why supervalueation can be applied here. When the difference gets bigger, one starts to experience the targets as different in length. The notion of matching profile and related apparatus can be invoked to model the transitions in question. Notice that here I do not commit myself to the view that supervalueation is the correct model of vagueness. The idea that supervalueation is helpful in understanding perception is an independent one.

Just to illustrate the idea with another example. Consider two lines with similar lengths. One’s visual experience of line A has this matching profile:

A: $\{L_1, L_2, L_3, L_4\}$

While the visual experience of line B has this matching profile:

B: $\{L_4, L_5, L_6, L_7\}$

In this case, even if the two profiles are not identical, given that there is an overlap, L_4 , the subject in question cannot discriminate A from B. When we make B a bit longer so that the matching profile of it no longer contains L_4 , the subject becomes able to tell A from B. The better one's visual acuity is, the smaller the matching profile would be. In Chapter 3 I will argue for the thesis that attention can narrow down the range of matching profiles and therefore enhance one's visual acuity, but for now what is crucial is to have a grip of the idea of matching profile and related notions. One worry about this example might be that since I represent the profiles with natural numbers, they look discrete and therefore digital. For example, it looks like there can be $L_{2.5}$ between L_2 and L_3 . If so, the example is inappropriate for my purposes. But this misconstrues the example. The subscripts after L do not represent actual lengths. If they were, it would indeed be correct to say that between 2 and 3 there can be many lengths. But the numbers do not work like this in the example. Compare the example in which philosophers talk about time T_1 and T_2 . The question about whether there is $T_{1.5}$ does not even arise because the question misconstrues the symbolism. However, to avoid misunderstanding perhaps we can represent the matching profiles like this:

$$\{L_i \mid 1 < i < 5\}$$

$$\{L_{ii} \mid 4 < ii < 8\}$$

In this symbolism, numbers do represent actual lengths (though without specified unit), unlike the original way of representing the two matching profiles. Now I want to highlight two qualifications. First, nowadays many philosophers hold the view that experiences have accuracy conditions that are not binary, but the model of understanding how this is so is seldom spelled out. Secondly, it is a further claim that these veridicality conditions constitute experiences' contents. Some philosophers have recognised this and offer explicit further arguments for the 'content view' of experience (e.g., Siegel 2010, Schellenberg 2011). Here my project is silent about this further step.

It is at this point where Peacocke introduces his notion of 'manner' (ibid.: 5). It is supposed to capture the *experiential* aspect of seeing. These manners are psychologically real 'because their individuation supervenes on

facts about the matching relations sustained by a subject's mental states' (ibid.: 6). Another point is that manners are *modality-general*: one can see and hear something from the same direction.⁷ Now the key point is that manners are *analogue*, in the sense we discussed above. The crucial point is that '*approximation* makes sense only where there is a dimension of variation which is covered by the kind of content in question' (ibid.: 9; my emphasis). By 'the kind of content' Peacocke means analogue content, and again for our purposes we can abstract away from talks about representational content. And 'approximation' refers to the idea that we do not experience things with *precise* distance, directions, and so on. Manners and their analogue nature are postulated to explain this psychological fact, amongst other things.

After sketching his notion of manner, Peacocke proceeds to argue that manner is distinct from both perceptual object and 'perceptual-demonstrative thought constituent (Fregean modes of presentation)' (ibid.: 9). For the former, he uses examples to show that 'manners of perception of distance [or length] are in a many-one relation to the distance [or length] perceived' (ibid.: 10). I believe there is an even easier way to show that manner is distinct from perceived object: as Peacocke himself notes, 'the notion [of manner] has been introduced here in the context of the phrase "thing perceived in a particular manner"' (ibid.: 5). This implies that they are distinct by definition. It is like in the case of language the referent is distinct from ways we talk about the referent.

To differentiate manner from Fregean mode of presentation is more difficult. Again Peacocke here invokes an example to illustrate the point. Suppose one notices that two things 'match in respect of apparent length' (ibid.: 11). Now let's stipulate that they are in fact the same length, and also perceived in exactly the same manner. For *reductio*, we also assume that 'there is for each length *presented in a given manner* a unique demonstrative mode of presentation of it of the form "that length"' (ibid.: 11). Together with other stipulations in the example it follows that the modes of presentation 'that length' with the two perceived objects are identical. But indeed the subject in question can be in doubt as to whether the modes of presentation associated

⁷ Peacocke uses the term 'amodal,' but it seems to be more appropriate to use 'modality-general' and contrast it with 'modality-specific.'

with each objects are in fact identical. The statement that ‘that length (in relation to one object) and that length (in relation to the other) are the same’ is informative. Their modes of presentation are not identical. This contradicts the assumption that there is a one-one correspondence between mode of presentation and manner.

The dialectic here seems to be this: Peacocke holds the view that manners are analogue, and in later writings he makes a related claim that they are *nonconceptual* (1998: 381). There he explicitly distinguishes manners from Fregean senses associated with demonstrative *concept*. For this purpose he has to argue that manners as he understands them are different from modes of presentation.⁸

My preliminary discussion of Peacocke’s view of the analogue nature of vision ends here. It will play a significant role in the key case of the thesis, namely the Sperling paradigm discussed in Chapter 2. Before leaving this chapter I just want to briefly remind ourselves what got us to the present direction. In the Campbellian agenda, the first two steps are from the imagistic to the propositional and from the subliminal to the phenomenal. Peacocke’s discussion is relevant to both. To be analogue is a specific way to be imagistic, and with this idea of analogue we will need to come up with an account of the first transition. Also, what Peacocke has in mind here is visual phenomenology, so we have seen that there is a danger of oscillating between vision in the information processing sense and awareness in vision. Chapter 2 will make this issue more explicit by considering some interactions between psychological experiments and related conceptual issues.

⁸ At this point Peacocke remarks about the key difference between perception and propositional attitudes: ‘there is no reason these different notions must coincide’ (ibid.: 12). It is instructive to compare this with McDowellian transcendental argument to the effect that they *must* coincide (1996). But I will leave it here for the time being.

CHAPTER 2

Specific Phenomenology

2.1 Sperling's Partial Report Paradigm: A Case Study

So far, we have set up the project with the three transitions offered by Campbell (1997, 2004, 2011). In Chapter 1, we invoked a notion of the analogue developed by Peacocke (1986, 1989) to understand a way vision can be imagistic. However towards the end we reached an ambiguity between vision in the information processing sense and visual experience. When Dretske discusses the transition from the analogue to the digital, consciousness is not involved; both his examples of the photograph and the simple mechanism do not involve any kind of experience. When Peacocke develops his notion of the analogue, it is explicitly about phenomenology: he invokes phenomenological considerations, amongst other things, to motivate the postulation of content. Where should we focus, vision or visual experience?

There is no easy answer to this question. In order to further investigate it, in this chapter we discuss George Sperling's iconic memory experiment in detail. In what follows I describe the experiment first and then offer three reasons for bringing it up in the present context. At the beginning of the experiments, participants look at a blank screen with a fixation point in the middle of the screen. An array of letters constituting a grid then comes in as stimuli for 15-500 milliseconds. After the stimuli disappear, there will be a delay with a blank screen; the period of delay depends on specific experimental settings for different purposes. Then crucially, a cue tone comes in signifying

which row the participants are supposed to report (high tone for the high row, etc.). Since there is a delay between the stimuli and the cue, one might expect that the cue will not have any significant effect, since it comes too late. Surprisingly, however, participants are actually very good at reporting the given row accurately, even though the cue comes much later than the stimuli.

Now why is it appropriate to direct our discussion to this at this stage? First, in understanding what is going on in this setting, psychologists have drawn a significant distinction between *informational* and *visible* persistence (Coltheart 1980), and this exactly highlights our issue concerning vision in the information processing sense and visual experience (more on this below). Secondly, Sperling's experiment, and other similar cases in psychology, epitomise elements we need in understanding visual knowledge, the larger project we have in the background. In the experiment it involves both *vision* and visual *experience* for sure, and participants need to form *beliefs* for reports. Amongst those beliefs some are true beliefs, and amongst those true beliefs some constitute *knowledge*. All of them are what we need in the background project. To be sure, in conducting these experiments psychologists do not ask the same questions as philosophers do, for example they do not care about the epistemic status, such as entitlement, of beliefs. However, we can use those experiments to think about issues that interest us as philosophers. Finally, and very generally, to anchor philosophical discussions of mind and perception to empirical studies might be helpful at least sometimes. The departure of psychology from philosophy happened less than 150 years ago, but many questions in philosophy of mind and perception are older than that. One major virtue of psychology as science is that it attempts to operationalise many notions they use, and conduct careful controls as much as possible. This is a virtue, but it also has its limit: some real questions can be asked, but maybe difficult or even impossible for us to operationalise. This is why towards the end of talks or papers in psychology they like to say that from this point they are *speculating*. This is roughly where philosophy takes over. Given this continuity, it is a good idea to anchor philosophical thoughts to some carefully controlled experiments. To say this is certainly not to claim that *every* question in philosophy of mind and perception *has to* be dealt with in this fashion. This method is useful only when the issues in philosophy in question are close

enough to some extant experimental settings. This needs to be handled with care in a case-by-case manner. Also, this idea is different from the problematic thought that psychology in particular and science in general can solve our philosophical puzzles. This is a much stronger and also unwarranted claim. Psychology has become more and more successful after departing from philosophy, and there are good reasons for this. To think that science can solve our philosophical puzzles is an overly optimistic fantasy. The third reason I provided here is much weaker than this problematic claim.

So much for methodological considerations. Now we will discuss the distinction between informational and visible persistence, and why it is relevant to our project. Recall that we set out to understand the imagistic nature of vision and visual experience, and in Chapter 1 I suggested that Peacocke's notion of analogue content is helpful in this regard. Now in the context of understanding Sperling's paradigm, the notion we need to understand is Block's notion of *specific phenomenology*. The distinction between generic and specific phenomenology first appears in the reply Block makes to his various opponents (2007c). As he emphasises, this distinction is 'crucial in the overflow argument' (531). Here I aim at understanding this pair of notions and examining whether it supports Block's conclusion.

Psychologists have attempted to understand the Sperling in the past few decades. First of all, Ulric Neisser (1967) argues that the visual sensory memory involved is *iconic* in character. A further distinction between *visible* and *informational* persistence is made later by Max Coltheart (1980). According to a common understanding of Block's agenda, his argumentation comes in at this point, namely that in the Sperling paradigm, there is not only informational but also visible persistence. Call this the VISIBLE thesis. And his major opponents deny the further claim about visible persistence. This understanding is neat, but I will argue that it is incorrect. Let me explain. Coltheart (1980) argues that Sperling's case is only about informational persistence (see also Di Lollo 1980), and it has been further argued that while visible persistence is *negatively* correlated with stimulus duration, informational persistence is *positively* correlated with stimulus duration (Greene 2007). Also, techniques such as 'duration of stimulus technique' (Long 1980) and 'moving slit technique' (Haber and Standing 1970) are designed to test visible but not informational

persistence. If this standard conception is correct – namely that Sperling’s paradigm concerns informational persistence only, and visible persistence is a fundamentally different phenomenon – then Block’s contention is simply false: one view is the negation of the other. However, Block does *not* argue against this standard conception: when he discusses Coltheart (1980) and Di Lollo (1980), he cites them with approval (2007b: 490, 494). Something must have gone wrong here. Now consider Block’s summary of the locus of the disagreement:

There have to be such specific representations given that any location can be cued with high accuracy of response. The locus of controversy is *whether those specific representations are phenomenal*. (2007b: 531)

It is very natural to read this passage as saying that Block argues that in the Sperling paradigm there is not only *informational*, but also *visible* persistence, or in his terminology, ‘*phenomenal* persistence’ (ibid.: 487). That is, he holds the VISIBLE thesis. However, above we have just argued that this cannot be the case, since if so he has to disagree with the standard conception, but he does not. What is going on here?

One possible conclusion can be drawn is that Block’s view is a nonstarter: given that psychology has strongly established that informational and visible persistence are simply different elements of iconic memory and the Sperling paradigm is not about visible persistence at all, Block’s view (i.e., the VISIBLE thesis) is simply false (Irvine 2013: 126-9). This idea is not responsive to the puzzle that Block does not even attempt to refute Coltheart and Di Lollo; rather, he cites them rather approvingly. A better interpretation, I submit, is that Block’s view is *not* a challenge to the standard conception, and that is why he agrees with the standard conception when discussing them. How can this be? The answer is that Block mischaracterises the dialectic, and since the characterisation is so natural, many of his opponents follow that as well. Block (2007b) talks extensively about phenomenal or visible persistence, as if it is his subject matter: as if he is arguing that in the Sperling experiment, not only informational but also visible persistence are involved. But this is *not* what he is aiming at. Recall the passage quoted above: ‘[t]here have to be such

specific representations given that any location can be cued with high accuracy of response. The locus of controversy is *whether those specific representations are phenomenal?* The correct reading of this claim should be this: it is right to say that the Sperling paradigm concerns informational persistence only, as the standard conception has it, but there is a further question, namely: whether the persisting information in the visual system is *phenomenal*. This sounds pretty much like the common reading I am resisting, but we need to distinguish them carefully. As the standard conception says, and Block should agree, visible persistence is something else that should be tested with other paradigms and methods. However, based on this shared starting point, one can still ask a further question: is the persisting information involved in the Sperling paradigm phenomenal? This sounds so similar to the common (mis)understanding of the dialectic that even Block himself is sometimes confused in characterising the debate, and that is why he mentions visible persistence constantly in his argumentation. But if my proposal here is correct, the subject matter is informational persistence only. Elizabeth Irvine's reading (2013) is too strong in that it does not take the crucial passage I quoted by Block above into account.

Since I believe all parties should agree that Sperling's paradigm is only about informational persistence, from now on I will not mention visible persistence at all so that we can avoid confusion. Again the question we should be asking is that given that in the Sperling paradigm we must postulate informational persistence to explain subject's cognitive achievement, is the persisting information *phenomenal*? What we mean by 'phenomenal' is this: some information is phenomenal if and only if it *shows up in experience*. So the question is: 'does the persisting information show up in experience?' If the answer is positive, and Block certainly thinks it is, then the resulting view is the EXPERIENTIAL thesis. Now there is a further thesis that Block seems to hold, namely that not only that the persisting information shows up in experience, but also this experiential information plays a *causal* role in explaining participants' cognitive achievement. The relevant experience explains the success of reports. Call this further claim the ENABLING thesis. Block seems to hold this view because he emphasises the fact that many participants say

that they *read off* answers from residual visual phenomenology. That means visual phenomenology is casually relevant in achieving the Sperling task.

Let me try to present the dialectic in a more structural way. I argue that we have three propositions to reconcile:

A. The standard conception has it that Sperling's case concerns informational persistence only; visible persistence is a fundamentally different phenomenon.

B. Block (2007b, c) basically agrees with this conception.

C. Block's OVERFLOW says the Sperling case involves not only informational but visible persistence.

They are inconsistent because A and C contradict each other and B says that Block agrees with A. The way out I suggested is to recognise that contrary to the natural reading, Block's argument for OVERFLOW is *not* about visible or phenomenal persistent understood in Coltheart's sense at all, albeit Block himself seems to miss this point as well. That is, I propose that we should deny C. What he is arguing is in effect that the persisting information in Sperling's paradigm is *phenomenal*, i.e., shows up in experience. This is different from the claim that in Sperling's paradigm not only informational but also visible persistence understood in Coltheart's sense are involved. Irvine (2013) holds onto C and does not discuss B at all, i.e., it is not that she considers this tripod and argues that we should give up B; she seems to miss B, and therefore she can proceed to hold C. But B is a matter of Block scholarship; it is something we can settle by perusing Block (2007b, c). As far as I can tell, Block agrees with the standard conception in page 490 and 494. So I suggest we should keep B. And we can decide whether A is true by reviewing the relevant psychological literature. As far as I can tell A is also true. Whether this conception is correct is not relevant to our purposes; the point is that it is standard and Block believes it too. And Irvine agrees with this understanding of the standard conception (2013: 126).

So where are we now at this point? There are three theses involved in the present discussion:

VISIBLE Thesis: In the Sperling paradigm, not only informational persistence but also visible persistence in Coltheart's sense are involved.

EXPERIENTIAL Thesis: In the Sperling paradigm, some pieces of persisting information show up in experiences.

ENABLING Thesis: In the Sperling paradigm, the pieces of information showing up in experiences play a causal role in explaining participants' success of reports.

In this section I have argued that we should not read Block as holding the VISIBLE thesis, even if he himself is not clear about this. I also offered reasons why Block does hold both the EXPERIENTIAL thesis and the ENABLING thesis. My discussion here is perhaps longer than it needs, but this is because if I am right here, virtually every piece in this literature misunderstands this crucial dialectic. This does not mean that the extant discussions are all useless, to be sure, but to make progress this correction of our take of the dialectic has to be solid.

2.2 Block's Case for OVERFLOW and Its Critics

In the quotation above (2007c: 531), Block says that to postulate specific representations to explain participants' performances is uncontroversial. This refers to the idea that informational persistence is invoked to explain the success of report. Block then argues that these specific representations are phenomenal. As a result, the notion of 'specific phenomenology' becomes crucial to him. This section discusses Block's understanding of the notion and his arguments that specific phenomenology is involved before the cue.

In the original paper, Block does not have this terminology for the notion. There he talks about 'experience...as of more specific shape' (2007c: 489). In the reply, he makes explicit the notion and applies it to the Sperling paradigm. He argues that before the cue, participants enjoy:

Generic phenomenology: *‘that there is an array of alphanumeric characters.’*

Specific phenomenology: *‘of specific shapes of all or most items in the array.’*

An initial question is how to make of the nature of this distinction. Block seems to think that they are different in kind. For example he writes:

My argument is that before the cue, there is specific phenomenology for all or almost all items (*and also* generic phenomenology, though that does not figure in the argument). (2007c: 531; my emphasis)

So for him, generic and specific phenomenologies are two layers; they do not constitute a continuous spectrum.⁹ However, he does not offer arguments for this view. For our purposes I bypass this issue. For now I focus on specific phenomenology, which is Block’s way to capture phenomenal specificity. Unfortunately, Block does not further explicate the notion beyond the statement quoted above. In order to make progress, in this section I will work with the simple characterisation he gives, and consider his various arguments for either the EXPERIENTIAL thesis or ENABLING thesis.¹⁰ Later in the chapter I will seek to improve our notion of specific phenomenology. With his notion of specific phenomenology, we can reformulate the two theses Block holds more specifically:

Block’s EXPERIENTIAL Thesis: In the Sperling paradigm, participants have specific phenomenology for almost every item.

⁹ M. G. F. Martin points out to me that the layer view and the spectrum view are not as such incompatible; for example it is possible that within each layer there is a spectrum along certain dimension. Since in what follows I do not pursue this idea, rather I will focus on specific phenomenology only, I shall not commit myself to any substantive view concern this matter here.

¹⁰ As it stands, Block’s characterisation is either false or circular. An uncharitable reader can say that we can have fuzzy or indeterminate phenomenology ‘of specific shapes,’ so the characterisation is false. A more charitable reading is that we have specific phenomenology of specific shapes, but this renders the characterisation circular, since specific phenomenology is what we want to understand here. But in this section I assume for the sake of argument that we can make intuitive sense of specific phenomenology, and proceed to examine Block’s arguments to see if they are any good.

We here use ‘specific phenomenology’ to replace ‘persisting information in experiences.’ Also we use ‘almost every’ to replace ‘some’ because Block insists on this stronger view (2007b, c, *passim*). In addition to this, we have

Block’s ENABLING Thesis: In the Sperling paradigm, specific phenomenology is causally responsible for the success of reports.

The latter thesis entails the former one, so if Block has a good case for the latter, it is sufficient to make his case. Now to the arguments and replies.

Argument 1: ‘As Burge notices, subjects (including myself [i.e., Block]) in overflow experiments often testify that their responses are based on specific phenomenology that was there all along.’ (Block 2007c, 531)

Reply: This claim about ‘based on’ reinforces the interpretation that Block also holds the stronger ENABLING thesis. It is true that we should take seriously participants’ reports at least as the starting point, but given the transient nature of the stimuli in the Sperling case, one can reasonably suspect that subjects are not in a good position to have a true description of their experiences. It may be true that they *read off* answers from specific phenomenologies, but it does not mean that those phenomenologies are there *all along*. It is possible that those specific pieces of *information* are there all along, but they become conscious only *after* the cue tone. Also, there is a distinction between participants *actually* read off answers from visual phenomenology and participants *feel* that they read off answers like that. Only the former supports the ENABLING thesis, but from their reports there is no way to tease these two hypotheses apart.

Argument 2: ‘Subjects are attending to arrays in full view, in good viewing conditions, for half a second in...some versions of the Sperling experiments...more than enough time for specific phenomenology (Burge also makes this point).’ (ibid., 532)

Reply: This argument is supposed to support the weaker EXPERIENTIAL thesis. This is a point about timing. Suppose, contrary to any

Sperling experiment, we show the array of letters for a really long time, say ten seconds. But we ask subjects to fixate at a given point, and try to report all letters by switching their attention. This should be an easy task, since in this setting they have plenty of time (if ten seconds are not enough, we can further prolong it). Now I predict that if participants fixate at the middle of the screen, and turn their attention to the upper row in order to report letters there, they will not have specific phenomenologies of the lower row at that moment, no matter how long the stimuli persist. If so, then it is not true that participants have specific phenomenologies of almost all items all along in the standard Sperling experiments, since they cannot have that even in the version I am envisaging, i.e., the stimuli persist for a really long time. It is the *spatial* arrangement of the stimuli that prevents us from having specific phenomenologies of most items, given the limits of fovea vision and attention. This is not just a speculation; we can actually do it with any demo for iconic memory test or with the stimuli on a piece of paper.

Argument 3: ‘If there is only generic phenomenology before the cue, and if the cue causes the generic phenomenology to be replaced by specific phenomenology, then there is a shift from generic to specific phenomenology. The fact that subjects report no such phenomenological shift might not be strong evidence against this view, but it is some evidence.’ (ibid.)

Reply: This is again about the EXPERIENTIAL thesis, and more specifically about the kind(s) of phenomenology involved. Here I agree with Block that it is probably some evidence, but it is indeed not a very strong one. Consider the famous Carrasco ‘attention alters appearance’ experiments:

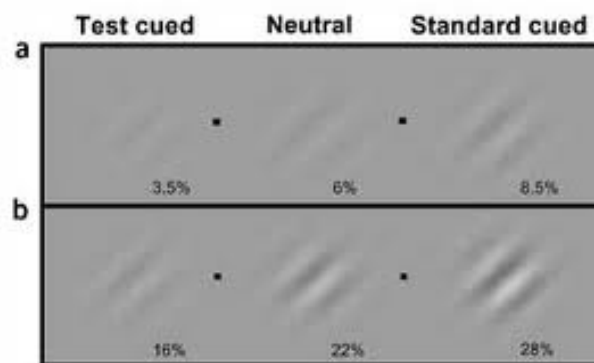


Figure 1, from Carrasco et. al. (2004)

The four dots in the figure are fixation points. Let's try the one between the 22% patch and the 28% one. If you fixate at that dot and covertly switch your attention to the 22% patch, the attention will boost the contrast of that patch so that it looks just like the 28% one (contrasts are defined objectively via mathematics). Now, do participants feel the transition before and after they shift attention? Arguably not. The reason for this, I submit, is that the effect attention can give us is not very drastic. Comparing the case of eyeglasses. If one has myopic and he uses a pair of glasses for better sight, his visual phenomenologies before and after he puts on the glasses will be extremely different. After all, that is the whole point of having glasses. Therefore, whenever he puts on or takes off glasses, he will feel a shift/transition of phenomenology. However, attention does not work like this. Although it will alter appearances, as Carrasco and her colleagues have shown, the effect is incomparable with glasses. This explains why subjects do not feel the shift of phenomenology, and thereby saves Block's opponent at least in this respect. Moreover, Block's opponents do not have to hold that before the cue there is only generic phenomenology. For example, his opponents can hold that before the cue, there are some specific phenomenologies due to attentional effects: before the cue, participants' attention will flow randomly so that they will enjoy certain specific phenomenologies. There will be more on this view in my reply to argument 6.

Argument 4: 'There is evidence mentioned in the target article that cortical persistence obtains at all levels of the visual system and therefore at the phenomenal level as well...Hence, there is a neural case for phenomenal persistence.' (ibid.)

Reply: There is indeed a case to be made here for the EXPERIENTIAL thesis. However, as Coltheart stresses, neural persistence should also be separated from phenomenal persistence (1980, 184). Block is right in pointing out that neural persistence might favour his view to some extent, but more need to be said at this point if one wants to bridge neural and phenomenal persistence. Simply pointing out there is neural persistence does not itself constitute any support for phenomenal persistence, since whether that

particular neural persistence is the neural substrate of phenomenology is to be determined.

Argument 5: This one is about ‘Di Lollo’s paradigm using a 5 by 5 grid in which all but one of the squares is filled with a dot. Subjects see a partial grid with 12 of the dots filled in, then, after a delay, another partial grid with a different 12 dots filled in. The subjects’ task is to report which square has a missing dot... [In] the variant by Brockmole et al. (2002)...the appearance of the second partial grid was delayed by as long as 5 seconds and in which subjects were told that a good strategy was to “imagine the dots still being present after they disappear” (317).’ (ibid.)

Reply: Block’s main point here is that the delay of 5 seconds is so long that we need phenomenal persistence to explain the situation. This might be about the ENABLING thesis since perhaps participants are answering *based on* their imaginations. However, I believe the fact that it is so long should be interpreted as a ground to cast doubt on phenomenal persistence, contra Block. As he notices, participants are instructed to ‘imagine’ the persistence, and this opens the possibility that they are using their conceptual, *cognitive* capacities to do so, as opposed to phenomenal capacities. Again, more needs to be said for Block to make this argument work.

Argument 6: ‘Kouider et al....hypothesize that Sperling-like paradigms result from “partial awareness: subjects have a transient and degraded access to fragments of all the letters in the grid.”...What are Kouider et al. saying about specific phenomenology? No specific phenomenology at all is not compatible with their view, since they say subjects are to some degree conscious of and have access to “fragments of all the letters in the grid”.’ (ibid.)

Reply: Block is right in pointing out that Kouider et al. (2007) cannot maintain that no specific phenomenology before the cue. But they need not, as I mentioned in my reply to argument 3. Block’s opponents can hold that attention gives rise to some specific phenomenologies. Since before the cue, participants’ attention will flow randomly, they will enjoy some specific phenomenologies. This explains why in the trials without any cue, subjects can still report correctly around four (random) letters. So Block’s opponents

should not hold that there is absolutely no specific phenomenology before the cue. What they should insist is that those specific phenomenologies are not as rich as Block describes. Consider a similar distinction of gist and object perception in psychology. In relevant experiments, the stimuli persist so short that participants can only report accurately about the gist. This does not imply that subjects see absolutely *no* detail. They do see some, but not as much as Block's view predicts.

What does all this leave to us? I am certainly not asserting that Block's six arguments are all defeated. What I have attempted to show is that all of them raise substantive issues that need to be considered further, but none of them is unanswerable by his opponents. So here I conclude that Block has not established that before the cue in the Sperling paradigm, participants have specific phenomenology for almost every item.

To summarise, in this section I argue that Block has not provided a satisfactory understanding of what specific phenomenology is, and even if we proceed with his simple characterisation and evaluate his arguments, none of them really establishes his version of the EXPERIENTIAL and ENABLING theses. In the next section I will connect the present discussion to the subject matter of a previous chapter, the analogue character of vision.

2.3 Specific Phenomenology and the Analogue

One entry point to think about specific phenomenology is this. Block's opponents can raise this reasonable challenge: if pieces of phenomenology before the cue are indeed specific, how is it that we still miss the identity of many letters? That is, how is it possible that a piece of phenomenology is specific but neutral between 'E' and 'F'? This query can be stated in terms of spatial, textual, and other visual features as well. It is this query that leads many to the fragmentary view (e.g., Kouider et al. 2010) and the generic view (e.g., Stazicker 2011). They believe that phenomenology is non-specific because, say, it can be neutral between 'E,' 'F,' and maybe some pseudo letters. They then come up with positive proposals of ways of being non-specific, for example indeterminate or vague (Stazicker 2011), inexact or shifty (Hellie 2005), and so on. Many of those proposals are worthy of exploring. But here I will argue that

even if under certain circumstances vision is indeterminate or inexact (e.g., peripheral vision), there is still a case to be made for specific phenomenology. Or at least, we need to explain why some visual experiences *purport to* be specific, even if they are not as specific as Block proposes.¹¹

Recall what Peacocke means by ‘matching profile’: for direction, the ‘matching profile is a set of directions: a given direction is in the set if and only if it is not discriminably outside the apparent direction of the end of the perceived arm’ (1986: 4). The bigger a matching profile’s range is, the lower a subject’s visual acuity is. Also recall that Peacocke points out that ‘precise direction experienced’ is incoherent: given that human discriminatory capacities are limited, there has to be a set of direction that is compatible with an experience and still makes the experience veridical. Now consider our case of ‘E’ and ‘F.’ An experience can *purport to* be specific even if it is neutral between ‘E’ and ‘F.’ In daily life, if one’s experience is neutral between ‘E’ and ‘F,’ this person’s visual acuity will be judged as quite low. However, if it is in certain experimental settings such as the Sperling paradigm, it is more reasonable to have this kind of acuity because the duration of the stimuli is down to millisecond’s scale.

Now, does this conception of specific phenomenology serve Block’s purpose? I believe the answer is negative. For Block, he needs phenomenology that is *specific enough for report accurately*. The analogue conception allows an experience be specific to some extent but still undecided between, say, ‘E’ and ‘F.’ In that case, the reports will be inaccurate. We have independent reasons to hold this analogue conception of vision, as the previous chapter has argued, but it does not serve Block’s purpose. A deeper response is that this analogue conception does not commit any version of the ENABLING thesis: it is about vision’s character and is neutral about its causal power. If this is so, there is no prospect that this conception of specific phenomenology can help with Block’s agenda.

¹¹ Presumably, Block would answer to this challenge by saying that given his distinction between P-consciousness and A-consciousness, this challenge is not a serious one, since he can say that participants’ phenomenology is actually specific, and the neutrality comes from access. Given that they are separate in Block’s picture, it is plausible for him to say that the point is no challenge for him. However, this begs the question against the current point. Whether we can sensibly draw the distinction between phenomenology and access is exactly at issue. To assume it and say that there is no challenge here is not very effective.

There are two things we want to explain in the Sperling-style cases: the success and the failure of reports. The analogue conception might not be able to do so, since as I just argued it is silent about the causal power of visual experience. The success and the failure can all be explained in informational terms. However, the analogue conception can explain the nature of specific phenomenology involved in Sperling's paradigm. Suppose there is an 'E' in the cued row. Since it is cued, if the participant has followed the instruction, she should shift her attention to the given row. This improves her visual acuity of that row, i.e., the relevant matching profile shrinks so that 'F' can be ruled out. By contrast, if 'E' is in an un-cued row, the subject's matching profile there will be bigger, so perhaps 'F' will fall within the range, and she might fail to differentiate 'E' and 'F' in her experiences in that case. Block's picture is different from this since in his picture, in the un-cued rows the range of specific phenomenology will only cover one letter, say different shapes or fonts of 'E,' but not other similar letters such as 'F.' His claim here crucially relies on an *independence* assumption, which will be discussed and rejected in Chapter 3.

As briefly mentioned at the beginning, Block takes Landman et al. (2003) as a further evidence for his view. Here is the illustration:

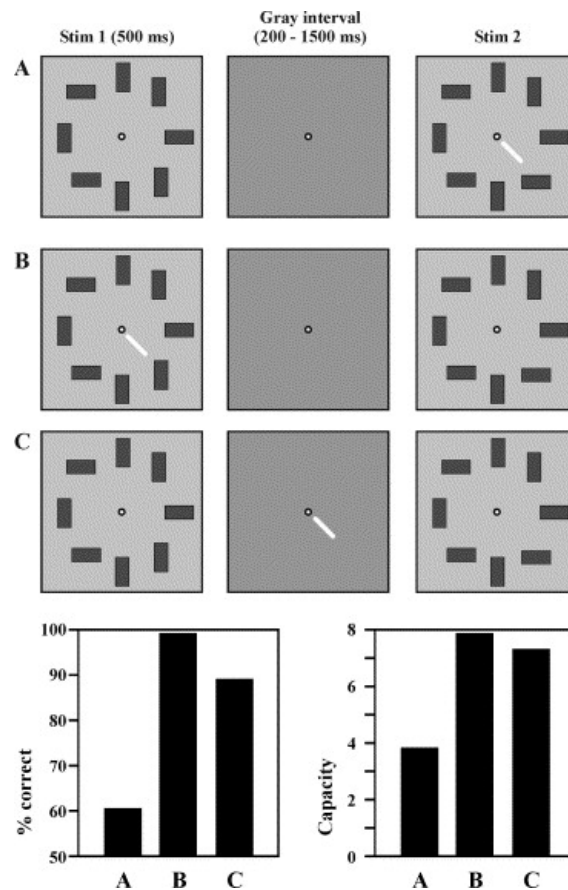


Figure 4. From Landman 2003

In the crucial trial (condition C), the participants need to indicate whether the pointed item has changed its orientation after the delay. Like the Sperling original experiment, what is surprising is that if the cue appears after the first set of stimuli, and the gap between is quite large (hundreds of milliseconds), participants can still perform the tasks quite well. In this series of experiment, the delay is much longer than many other paradigms (i.e., can be up to 1500 milliseconds). Block takes it that the longer delay further supports his view. However, it has been pointed out (Phillips 2011) that here the measurement is forced choice, which is much less demanding than the original Sperling case, in which participants need to come up with the identities of letters. The forced choice method, though useful for many purposes, is crucially different from our original case. In terms of the analogue account, we should say that the cue directs our attention to the target so that the relevant matching profile becomes more sensitive, i.e., narrower. By the same token, if the cue does not appear at the right timing or at all, the matching profile will be much larger in range so that it might not even be able to differentiate horizontal and vertical

targets. Again, this might sound unlikely in normal cases, but given that in experiments the duration of the stimuli is several hundreds milliseconds, it is understandable that without the cuing effect the matching profile will be pretty huge, i.e., the visual acuity will be pretty low. This explains the specific phenomenology in the Landman 2003 experiment, but remain silent about whether these pieces of specific phenomenology play a causal role.

To conclude this chapter, both Block's understanding of specific phenomenology and his arguments for his version of the EXPERIENTIAL and ENABLING theses are unsatisfactory. His arguments do not work for different reasons I explained under individual arguments. And his notion of specific phenomenology is unsatisfactory since his characterisation of it is not substantive enough, and probably false. As an alternative I offer an analogue understanding for this notion, which heavily draws conceptual resources from Peacocke's early works on visual characters. Finally, although I have argued against Block's case, I argue that it is unsuccessful for subtler reasons, contra Irvine's idea that Block's case fails simply because it flies in the face of the fact that from the 80s psychologists has recognised the difference between visible and informational persistence.

What is my own take of the matter? I hold a version of the EXPERIENTIAL thesis, which is as follows:

Weak EXPERIENTIAL Thesis: In the Sperling paradigm, participants have phenomenology that *purports* to be specific in an analogue fashion.¹²

As for the ENABLING thesis, the situation is more complicated. On the one hand, the denial of it might lead us to unwanted epiphenomenalism. This view might be true but certainly requires more defence. On the other hand, if one affirms the thesis one might need to face the over-determination problem: if information persistence is postulated to explain subjects' cognitive achievement, it is supposed to be sufficient. But if so, why do we need specific phenomenology in the causal explanation at all? Here I make no commitment to the ENABLING thesis.

¹² More on this in Chapter 3.

Let's remind ourselves why the analogue account about discrimination can help us understand the Sperling case. Sperling's task is not itself a discrimination task. It is about categorisation and memory, so it is not simply a perception task. Talking about discrimination is relevant not because Sperling is a discrimination task (it isn't), but because discrimination is relevant to specific phenomenology which is crucial in understanding the paradigm.¹³

Next chapter we move to issues concerning attention. In the Sperling paradigm, the cue is effective because it directs participants' attention. This is plainly true, but at the same time quite vacuous. 'Attention' can mean many different things in daily language, and also in psychology. This semantic problem is a difficult one. What's more, even after roughly fixing the meaning, the nature of a given kind of attention is difficult to be determined. This will be the main topic of Chapter 3, but the major concern of the essay – understanding phenomenal specificity as an element of visual knowledge – should be always in the background.

¹³ In discussing Block, I use his term 'specific phenomenology' throughout, since after his 2007 reply to the critics it has become the standard phenomenology. We can say that Block uses that notion to understand what phenomenal specificity – our main topic – consists in. As discussed above, the notion he provides is unsatisfying, so the main aim of this essay is to provide a more substantive and plausible notion for understanding phenomenal specificity.

CHAPTER 3

Attention: Selection, Access and Modulation

3.1 Attention as Selection: Psychology

In this chapter, I explore the role attention plays in the Sperling paradigm and other cases. The reason for this is that attention is crucial in vision, visual experience, and the formation of visual beliefs. There are at least two questions we can ask about attention; the first is the metaphysical nature of it (what attention is), and secondly the functions of it (what attention does). Answers to these questions would perhaps inform each other, but still, there is a matter of emphasis. For example, Christopher Mole's theory that attention is cognitive unison (2011) places more emphasis on the metaphysical question (e.g., multiple realisability, levels of explanation, and supervenience in 30-4), while Sebastian Watzl places more emphasis on what attention does when putting forward the thesis that 'consciously attending to something consists of the conscious mental process of *structuring* one stream of consciousness so that some parts of it are more central than others' (2011: 145; my emphasis). In what follows I too will focus more on the functions of attention, as it is more relevant to my purposes here.

It is notoriously difficult to pin down what we mean by 'attention.' Here are some examples: pop-out, searching, monitoring, tracking, vigilance, selecting (Prinz 2010). In addition to these, psychologists draw two useful distinctions. The first is between overt and covert attention. When one shifts

one's attention by moving one's eyes or heads, it is a case of overt attention. By contrast, when one shifts attention without any observable behaviours, then we have a case of covert attention. Since overt attention involves certain bodily movements, it trivially involves a different set of neural substrates from covert attention. This point is sometimes worth making because some people might think that neural substrates are crucial in individuating kinds of attention. The second distinction – endogenous and exogenous attention – is more complicated. Endogenous attention is also known as top-down attention; it involves a subject's intention to direct her or his attention, while exogenous, bottom-up attention does not. So for example, if you are attending to the lecture and suddenly distracted by the siren outside the building, your endogenous attention to the speech is interrupted by exogenous attention that is drawn by the siren. Of course in real case the distinction is fuzzier, but the idea should be clear. This second distinction involves more controversies, since it is not clear whether endogenous and exogenous attention actually form a natural kind (i.e., whether they are the same or different in kind). But again metaphysical questions are not to the point in this project, so I shall set the worry aside for the moment.

What are the connections between these distinctions and the Sperling case? Recall that after the stimuli go off and a temporal gap, the cue comes in signifying which row should be reported. Assuming that participants are following the instruction of fixation, what they are using is *covert* attention when they need to report letters that are outside of the fovea. Also, since they are instructed to follow the cue, *endogenous* attention is thereby involved. How about the various tasks suggested by Prinz? Assuming participants are cooperating well, they should be vigilant in general during the trial, but in addition to that, what attention does for generating the reports is first and foremost *selection*, since the cue directs participants to select relevant letters. After that, participants need to *access* those letters so that they can report. How to understand the relevant notion of selection and access in this context is crucial for making progress.

Selection has always been a central theme in understanding attention. The debate between early and late selection is a classic example (Deutsch and Deutsch 1963). Against this background, Sperling's paradigm was designed to

test this function of attention, amongst other things. The notion of selection here seems to be intuitive enough – there is more information than we can handle at a given time, so we need to select parts of them for further processing. However, psychologists do not always mean the same thing when they use the term, and this will prove important when we assess the status of the rich view.

Contemporary research of selective attention began from Donald Broadbent's experiment on dichotic listening (1952). Typically, participants are presented with two simultaneous but different stimuli to the two ears. And the instruction is to pay attention to the message presented only to a certain ear. There have been many variations of this paradigm. Broadbent himself (1958) interprets the data as showing that stimuli that do not need response are discarded before being fully processed. A 'selective filter' is then postulated to explain the phenomenon. In this way, psychologists operationalise selection in informational terms (see also chapter 1). If relevant information is processed (to the extent that needs to be specified for specific purpose), then it is selected.

However, in certain contexts psychologists sometimes seem to have a more demanding idea of selection. For example, in our key Sperling case, one wants to know that whether participants can 'selectively report items from very brief visual displays' (Styles 2006: 27-8). In this case, selection means not only information processing but also reportability, which is a much more demanding notion. It is closer to what philosophers mean by 'access' (see next section). In order to make the contrast clear, I reserve the term 'selection' for information processing and use the term 'access' to maintain the link to reportability and rationality.¹⁴

3.2 Attention as Access: Philosophy

To develop the line of thought from last section, one can define access in purely information processing terms if one wishes, as in the case of selection,

¹⁴ Attention as selection is perhaps the key of cognitive psychology. Many later works seek to refine our understanding of it. For example Pashler (1997) further explores the question whether there is a bottleneck of attention, and Lavie (1995) proposes the notion of load to resolve the early-late selection debate. It is not sensible to try in summarising the relevant history in this context. All we need is to be clear that selection and access should mean different things in the study of attention.

but this might render it too weak. For example, if what we mean by ‘access’ here is simply ‘receiving information,’ then selection entails access, in which case we do not need that additional notion. Also, that weak notion of access is more useful when we talk about systems such as computers, in which a unit accesses information in another unit for further processing, but if our subject matter is human subjects, and more importantly, we want our notion of access to do some epistemological work in relation to knowledge, we had better defining a more substantive notion of access in order to fit our purposes. At this point, Block’s definition of what he calls ‘access consciousness’ is helpful:

[A state is] A-conscious if it is *poised* for direct control of thought and action... [A] representation is A-conscious if it is poised for free use in reasoning and for direct ‘*rational*’ control of action and speech (1995a/2007a: 168; my emphasis)

By ‘A-consciousness’ Block means ‘access consciousness.’ In what follows, however, when I use this and other similar notions I will use the term ‘accessibility.’ One reason is that in the definition Block makes it clear that it is a *dispositional* notion (‘poised’), so it is actually *accessibility*, rather than *access*. Also, some have argued that A-consciousness is not a kind of consciousness at all (Block 1995b/2007a: 219), and for my purposes I do not need to insist on this anyway. Now with this definition in place, we can define ‘access’ by taking out the dispositional qualification (poised for...), since the only relevant difference between access and accessibility here is whether it is dispositional or not. Now, the key virtue of this definition for us is that it links access to *rationality*, which is what we need in order to make the transition to knowledge. To be sure, ‘rationality’ is itself a term of art that needs further elucidation, but at least we need the term in place first as a starting point.

The discussion of selection and access brings us back to Campbell’s framework. In his recent work (e.g., 2011), he explicitly invokes the distinction between selection and access. Campbell says that selection and access are ‘two different aspects of attention’ (2011: 324), and this fits well with what we said above: there is no need to have a single notion of attention, at least for our purposes. Attention selects relevant information for further processing, and it

helps us access relevant information so that we can use them to make inferences and guide actions. There might be a question about individuating kinds of attention (e.g., what do we mean by ‘aspect’ here?), but this metaphysical query can be bracketed when it comes to understanding the Sperling case and the nature of visual knowledge. Campbell says that people very often mean ‘access’ when they talk about attention (ibid.: 323-4). By that I take it that he is referring to philosophers (e.g., Block 2007b, Burge 2007, Smithies 2011), since as we have seen above in psychology what has been dominant is ‘selection.’ But in the present context there is no need to choose one and abandon the other; we can invoke both as long as we are clear on what the differences are and what theoretical works we want them to do respectively.

Campbell first introduced this distinction in *Reference and Consciousness* with Treisman’s feature map theory, but in recent works he elucidates the distinction by referring to the Boolean map theory by Huang and Pashler (2007). In what follows I will not dwell on explicating that specific theory, since what Campbell says about selection and access and what I have to say about them do not hinge on that theory, and as it happens Campbell holds a different view from the one proposed by Huang and Pashler, so in order to avoid confusion in our discussion it is better not to mention the theory by Huang and Pashler. So much for disclaimers. Campbell’s position here is this:

[W]e should regard experience of a property as a matter of being in a position to use the property as the basis on which an object or region is *selected*, rather than as a matter of *accessing* the property. (2011: 324)

Campbell acknowledges that both selection and access are aspects of attention, but he attempts to tie experience to selection. With Campbell’s own usage, ‘selection’ means ‘using a property to *select* a region or object,’ and ‘access’ means ‘*accessing* a property of a region or object’ (ibid.: 325). This is where we can make a connection between the current discussion to the one concerning Block in the previous chapter. Recall that Block holds what he calls ‘OVERFLOW’ or ‘rich view,’ and in evaluating his arguments I made a

distinction between the experiential thesis and the enabling thesis. I hold a version of the former, which says:

Weak EXPERIENTIAL Thesis: In the Sperling paradigm, participants have phenomenology (or conscious experience) that *purports* to be specific in an analogue fashion.

This is not an enabling thesis because it is silent about whether consciousness has causal powers in relevant regards. This is a *weak* version of the thesis because it is weaker than Block's standard version, which says that by 'specific' we ought to mean 'specific enough for reporting accurately.' However, the analogue account adopted here (from Peacocke) says that many pieces of phenomenology can *purport to* be specific in Block's sense, i.e., they inform subjects that they are that specific; however, they can be neutral between, say, 'E' and 'F,' so that it can sustain reports' accuracy to some extent, but not as good as Block supposes. In the view I am proposing those pieces of phenomenology are still specific because, say, they definitely rule out 'L,' 'K,' and many other letters, though not decisive when it comes to 'E' and 'F.' This is the major dialectic throughout this essay. In Chapter 1 we discussed notions of analogue because it is helpful for us to understand 'specific phenomenology.' In the current chapter we are discussing Campbell's distinction between selection and access because it helps us understand how attention is involved in this picture. It might be hard to keep track of the general dialectic at this stage, but I will try to connect the present discussion back to the main thread when appropriate.¹⁵ Now here is Campbell's formulation of the rich view:

On this analysis, the connection of experience of a property to the visual information-processing machinery we have been describing is this: *Experience* of the property is what makes it possible for that property to be used as the basis for *selection* of a region or object. *Access*

¹⁵ In page 328-9 of the 2011 paper, Campbell describes the debate between the rich and sparse views concerning consciousness, and proceeds to offer his own view on it. This is blatantly the Block dialectic (2007a). However, Campbell does not mention any discussion from Block as well as other relevant thinkers, maybe for the ease of argumentation. I do not wish to investigate the author's psychology here. What I want to stress is that to see Campbell's effort in the 2011 paper this way is not a stretch at all – what he is engaging here is exactly the main concern of this essay, albeit he prefers conducting the discussion from different angles.

to the property is a distinct phenomenon, subsequent to the involvement of consciousness. This analysis lends itself to a rich view of conscious experience. (2011: 330; my emphasis)

And he uses an example of colour vision to argue for this point:

Consider a child, at this stage of development [2-year-old], looking at the kind of display often used to test for color-blindness – a green 5, say, showing against a background of red blobs, with the blobs constituting the 5 differing randomly from each other and from the blobs constituting the background in luminance, in shape, and in every other characteristic except hue...Whether the child can *see* the 5 is one thing. Whether the child is able to *access* the color of the object is another...[T]he child may be able to see the 5 without having anything in the way of color vocabulary, without being able to give any report of the color of the 5. Moreover, being able to see the 5 is consistent with not being able to put information about color to any *further use* [e.g., color induction]. (ibid.: 331; my emphasis)

Here we can see that Campbell's usage of 'access' fits the definition adopted here, i.e., the one from Block (1995a, 2007b) that emphasises the connection to rational and inferential capacities. For those who use a more deflationary definition of access (e.g., receiving information), it might be arguable that the example above still involves access, but this is compatible with the present claim, namely that given a thicker notion of access being adopted here, it is both conceptually and temporally separated from selection and experience. The justification of putting this notion of access in a central place here, again, is that it makes a connection to knowledge. Now what is crucial is to make the rich view based on the distinction between selection and access plausible. The case from other animals would be more vivid. Many animals have colour vision, but they cannot access the information in the relevant sense. I believe this is the correct way of thinking about the relation between attention and visual experience, i.e., one aspect of attention, namely *selection*, goes with experience, but the other aspect, namely access defined above, goes beyond experience.

How does this lend support to the interpretation of the Sperling experiment defended above? The view here says that the things which are selected are richer than those being accessed. In the Sperling case, we should say that participants select most items on the screen: it is *not* as if the un-cued rows do not enter into their visual consciousness. But although items in the un-cued rows are selected, they are not accessed in the sense that participants cannot use them to guide reports accurately. The experiential part of this story is accounted by the analogue, as explained in Chapter 2. Now the access part of it is accounted by access as *one* aspect of attention. The cue in the experiment directs one's attention to the target row so that participants access the relevant information and report accurately, and this attentional shift explains why the items selected but not accessed do not sustain accurate reports.

Campbell's 'selection and access' framework tells us two functions of attention. But I believe there is a third function that is missing in this framework. It is what I call 'modulation': in selecting and accessing targets, attention also *modulates* our percepts. There are more than one way that attention can do this; the Carrasco et al. 2004 finding discussed in Chapter 2 is one of them. In understanding the Sperling case, what we need is *postdiction*, since attention is cued *after* the stimuli offset. The next section evaluates a recent attempt of understanding Sperling with postdiction.

3.3 Postdiction as Modulation

The postdiction interpretation of the Sperling case has recently been introduced by Ian Phillips (2011). In a sentence, the hypothesis is that in the Sperling case what happens is *cross-modal postdiction*. It is postdiction, because according to the view the cue in effect *retrospectively* modifies what the participants consciously see. It is cross-modal because the cue tone is *auditory*, while the original array of stimuli are *visual*. This second part might not be essential to the discussion, since if in the trials we instead use visual cues such as arrows, we can still get the same effect and the debate raised by Block would still be valid. However, since normally the cue is auditory, it will be important

for the proponents of the postdiction interpretation to also argue that cross-modal postdiction actually happens in standard Sperling cases.

Before proceeding, here are three reasons why I need to discuss this view at this stage. First of all, I do not agree with certain details of Phillip's version, in particular I believe it is compatible with the weaker version of the rich view I hold. Secondly, I will strengthen the view by considering different measurements for consciousness and cognitive access. Thirdly, my version of the rich view seems to commit myself a certain version of postdiction, and if so it is mandatory for me to defend it at least to some extent.

I follow Phillips's steps here in explaining this phenomenon. A relatively uncontroversial case is 'backward visual masking.' Consider this often-cited figure below:



Figure 2. Target Stimulus Masking Stimulus

If the timing and the shapes of the stimuli are suitably designed, the participants will *not* be aware of the first stimulus. If the second target comes in between 50 to 100 ms, the effect will be the strongest (Alpern 1953; see Bachmann 1994 for a review). One thing we need to acknowledge immediately is that in the Sperling case, the delay can be much longer than 100 ms, so what we observe in this simple case cannot be applied directly to the Sperling case. Phillips then cites a study by Weisstein and Wong (1986) for the possibility of longer delays (Phillips 2011: 387-8). The second important thing to be recognised is that we need *cross-modal* postdiction, as mentioned above. For this, consider 'sound-induced visual bounce.' A and B move towards each other, briefly coincide, and finally move away from each other. Participants either see them as bouncing and reversing directions, or see them as pass through each other without changing the original directions. If a sound is played at the point

of coincidence, or close enough, participants more often see them as bouncing. Even when the sound is played with a 150 ms *delay*, the effect is still there (Sekuler, Sekuler, and Lau: 1997: 308). Again, the temporal window here is not big enough to apply to the Sperling case. However, in a later study Watanabe and Shimojo (2001) shows that ‘though a sound presented 300 ms after visual coincidence does not induce bounce, the “bounce-inducing effect was attenuated when other identical sounds (auditory flankers) were presented 300 ms before and after the simultaneous sound” (109)’ (Phillips 2011: 390).¹⁶

After having a grip of what postdiction perception is, we need to see exactly why it is in opposition with Block’s interpretation. The crucial assumption denied by this new interpretation is this:

[I]t is legitimate to sum partial reports to establish awareness in relevant similar cases...[This is] an *independence* assumption, viz. that a subject’s experience of the stimulus in a PR [i.e., partial report] condition is independent of which report is cued because the cue comes only *after* display offset. (ibid.: 385-6)

Postdiction, at least on the face of it, contradicts this independence assumption because it says that attention *modulates* the phenomenology of the cued row so that it *becomes* specific enough for report. On this picture, phenomenology for un-cued rows is not as specific as Block has it; it only becomes specific enough for accurate report *after being cued*. This is the core of Phillips’s objection. Now I shall move to what I have to say on these matters.

First, I believe under suitable interpretation, the cross-modal postdiction view is compatible with a weak version of the rich view, or OVERFLOW. Recall Block’s strong version of the view: before the cue, we have specific phenomenology (in his sense) for all or almost all letters. As we have seen, this view is not well supported by his arguments. Some of Block’s opponents go for the other extreme and argue that there is *only* generic phenomenology before the cue, for example Kouider et al. 2010. However, this view does not seem to do justice to the fact that in the trials in which there is no cue at all, the participants can still report about 4 letters accurately. If

¹⁶ See this page for demo: http://michaelbach.de/ot/mot_bounce/index.html

without the cue we enjoy only generic phenomenology, it is not clear how we can accommodate the full report condition. Now, even if the cross-modal postdiction interpretation is correct, we can and should still hold that before the cue, the participants will have specific phenomenology, though not for almost all letters, but for perhaps 4 letters or so. The reason is that before the cue, given the fixation point and the pre-cue attention, some parts of the visual field will still be more salient than other parts. But overall, the pre-cue phenomenology still overflows (i.e., is richer than) what attention can later capture, since before the cue there is also generic phenomenology. In a sentence, something between Kouider and Block is right (i.e., there are specific phenomenologies before the cue, but not as much as Block supposes), and this in-between view is compatible with the cross-modal postdiction interpretation.¹⁷

Secondly, the cross-modal postdiction view sits well with some findings by Morten Overgaard and his colleagues, which I also endorse. In what follows I first introduce the view, then explain its plausibility, and finally connect it to the current debate.

The leading question for Overgaard et al. is this: ‘Is conscious perception gradual or dichotomous’ (Overgaard 2006, 700)? According to Sergent and Dehaene (2004), it is dichotomous. The idea is that there is a clear threshold for being conscious, and after reaching that threshold consciousness is more or less stable. In showing this, Sergent and Dehaene design a scale consisting of 21 nodes, with the two extremes defined as seen or unseen. They then use this scale in experiments of attentional blink, ‘the phenomenon that the identification of a stimulus hinders an explicit report of a second stimulus if the two are temporally separated by between 200 and 500 ms’ (Overgaard et al. 2006, 701). What Sergent and Dehaene found is that subjects report in an all-or-none fashion: they are either conscious of the second stimulus, or not conscious of it at all.

As Overgaard et al. point out, however, this result from Sergent and Dehaene is flawed. For one thing, as Sergent and Dehaene themselves notice, subjects’ reports show a more continuous pattern when the experiments are

¹⁷ Perhaps Kouider would reply that he does not think that before the cue subjects have only generic phenomenology. Perhaps the view is that for *entirely unattended* stimuli phenomenology is purely generic. In that case I would have no objection here.

purely about masking, i.e., are not combined with attention blink. For another, and more importantly, the Sergent-Dehaene scale is biased: only two extremes are explicitly defined, and there are too many nodes (i.e., 19) in between (Overgaard et al. 2006, 702). To see the problem, recall whatever demos with short stimuli you have seen before, and ask yourself: is it possible to decide in a given case, the degree of conscious awareness is, say 6, as opposed to 8? If subjects have a feeling that they clearly see the stimuli, does it make sense to choose, say 18, as opposed to 20? It is predictable that given the design of the scale, subjects will tend to give all-or-none verdicts.

In order to make plausible the view that consciousness is a gradual phenomenon, Overgaard et al. propose another scale of measurement, Perceptual Awareness Scale (PAS). It is ‘a four-point scale categorized as “not seen,” “weak glimpse” (meaning “something was there but I had no idea what it was”), “almost clear image” (meaning “I think I know what was shown”) and “clear image”’ (Overgaard et al. 2006, 702). The improvements are, first, all nodes are clearly defined, and secondly, there are only two options between the two extremes. With this scale, subjects report in a ‘continuous manner’ (ibid.). With these two improvements, PAS is better than the Sergent-Dehaene scale, and PAS supports, though non-decisively, that consciousness is gradual, not dichotomous.

Now this discussion supports the weak rich view cum postdiction because the view requires that consciousness is a gradual phenomenon. According to the view, when we fixate at the middle and are cued to report the upper row, the phenomenology for letters in the upper row will probably be as specific as one can get, i.e., specific in Block’s sense. The phenomenology for the middle row would be less specific, but given that it is around the fixation point, and it is not that far away from the cued row, it might still be possible to sustain reports to some extent. For the lower row, on the one hand it is not around the fixation, and on the other it is further away from the cued row, the visual phenomenology for it would be least specific, but still not *purely* generic, since it does not make sense to think that purely generic phenomenology, i.e., without any specificity, exists at all. Now, it is obvious that this view requires the gradational view of conscious experiences, since it involves talks such as ‘most specific,’ ‘less/least specific,’ and so on. For the postdiction part, the

view says that attention can retrospectively makes a certain piece of phenomenology *more* specific, and again this requires the view the gradational view in question.

To conclude this chapter, let me restate what is supposed to establish here. The conclusion is *not* that Block's version of rich view is rejected. Rather, it is a weaker view that given our understandings of the analogue character of visual experience and the functions of attention, Sperling's case does not support Block's version of the rich view. To get the argumentative structure clearer, we can restate Block's rationales as follows:

I. If a row had been cued, participants would be able to report on it accurately.

II. Introspectively, participants believe that they read off answers from residual phenomenology.

III. It is legitimate to sum the results of partial reports across trials to establish the overall capacity of iconic memory.

They are not supposed to be elements of a deductive argument, since as Block likes to say, his arguments for the rich view are always inference to the best explanation. So what we can do is to examine his rationales individually and see whether they do support Block's view. Now I take it that **I** is uncontroversial; it is simply a factual description about participants' performances in Sperling. **III** has been challenged by Phillips's idea that attention retrospectively modulates our conscious percepts. I concur with this idea with some disagreement specified above. Now the key point of my argument so far is about **II**: there is no denying that the 'reading off' idea is what many participants think. But there are several complications here. For example, one may hold an error theory about it and say that participants massively misunderstand their own phenomenology. This is a possible view, but I tentatively side with Block that if there are other views available, error theories should be avoided. But even assuming that, there is a further question about how to understand this 'reading off' introspection. The hypothesis being put forward here is that after being cued, the relevant matching profiles become narrow enough to sustain accurate reports, so from participants' point

of view they do read off answers from phenomenology. It is just that according to the current hypothesis what they read off is also what their attention helps modulate after being cued. This is quite different from Block's view because in his picture, the matching profiles are *independent* of attention's allocation. For Block, before the cue un-cued rows' matching profiles look like this:

{E, E, E, E}

That is, it is specific enough for reporting that it is letter 'E,' though perhaps remains neutral between different fonts. In the picture I argue for, the matching profiles of un-cued rows would be like this:

{E, E, E, E, F, F, F, F}

That is, a given profile would not only neutral between different fonts of 'E,' but also other similar letters such as 'F.'

So now we need to choose between these two hypotheses. Common to both hypotheses is the crucial reliance on certain notion of specific phenomenology. So the choice between them partially hinges on which hypothesis has a better worked-out and explanatorily powerful notion of specific phenomenology. In Block's discussion, the description of specific phenomenology is only minimal. It did not appear in the original defence of the rich view, and was only introduced in response to objections. More importantly, the characterisation is not very helpful ('of specific shapes...'). By contrast, the above discussion offers a substantive understanding of it with the notions of the analogue, matching profile, visual acuity, and so on. It coheres with the account of attention's various functions, namely that attention can narrow down matching profiles in sensory discrimination. This is the main reason why I believe we should prefer the current account to Block's.

CHAPTER 4

Visual Demonstratives

4.1 Fixation and Peripheral Vision

Visual demonstratives enter into the picture at this point because reports in the Sperling case require participants to think thoughts in the form of ‘*that* letter is...’ even though they do not have to do this explicitly. Now what is the relation between attention and visual demonstratives? In answering this question, we need to be clear which sense of attention is in play here. Consider the Sperling case again. After being cued, information pertaining to un-cued rows are still parts of one’s visual awareness, though not robust enough to sustain accurate reports. The cued row, instead, is not only selected, but also *accessed* in the sense that now we can use the relevant information to sustain accurate reports. We can think thoughts that involve visual demonstratives about letters both in the cued row and un-cued rows, though with different degree of specificity: with the cued row we can think ‘that letter is “E”,’ while it is harder to do so for letters in the un-cued rows.¹⁸

Issues concerning fixation point and peripheral vision are relevant here since they interact with attention: attention very often, though not always, goes with the fixation. It would help us understand more about these issues if we

¹⁸ In the previous chapter, we have identified selection, modulation and access as functions of attention. Modulation plays a crucial role there when we interpret Sperling’s result with postdiction. For the purposes of this chapter, selection and access will be more relevant.

think of its applications in different cases. For example consider the following two figures from Fred Dretske (2010):

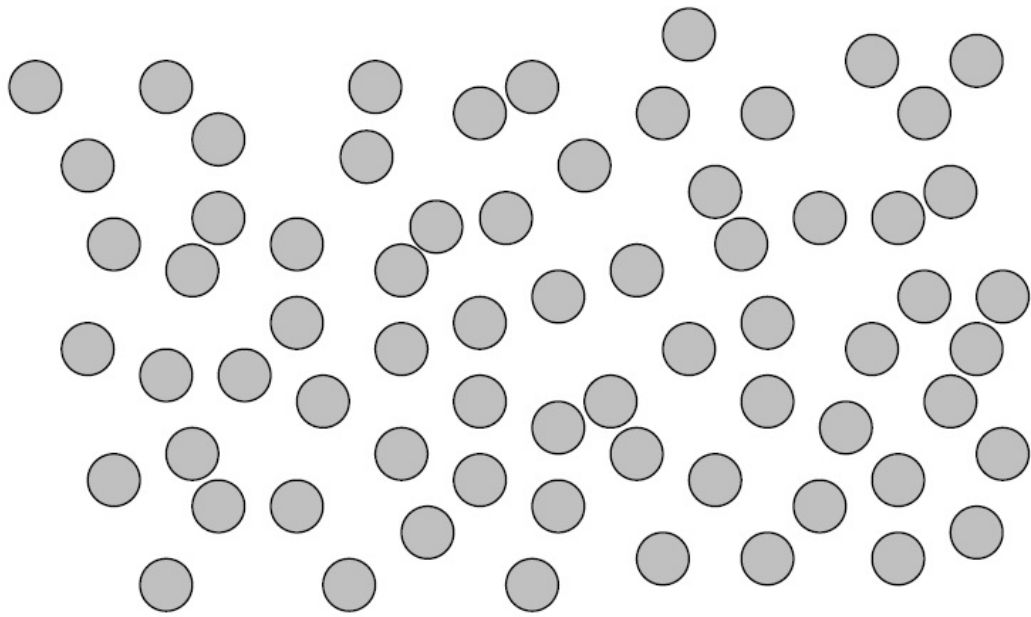


Figure 1

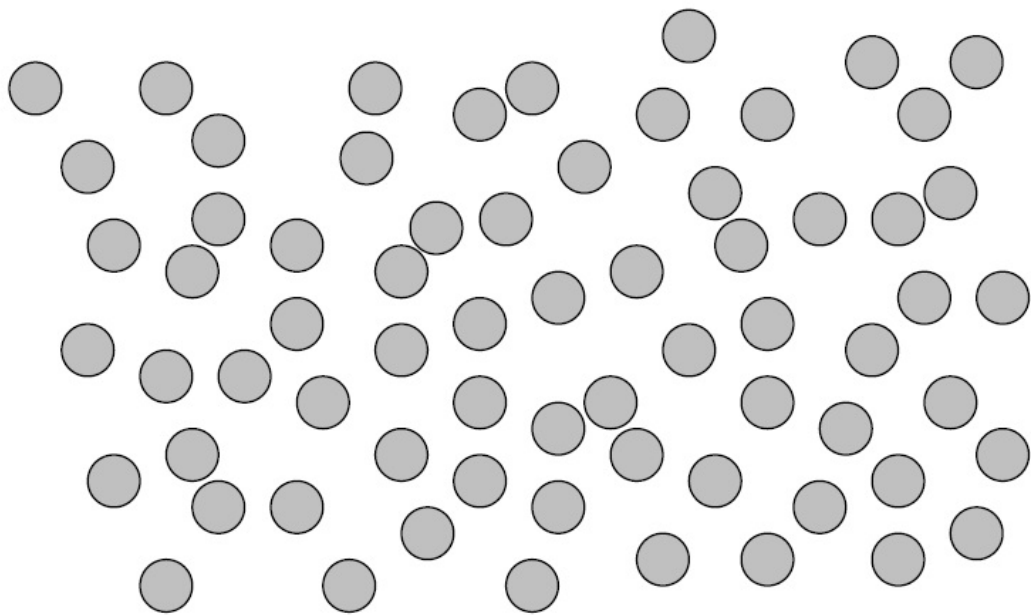


Figure 2

Dretske believes that we consciously see ‘a lot of the detail’ (ibid.: 54), and he substantiates this claim by referring to our experiences to figure 1 and 2. This is a version of the rich view, since it says that we consciously see a great amount of details than we can attend at a given moment. Dretske asks readers to ‘look, for just a moment,’ at the figures he offers, and claims that ‘a quick glance (one or two seconds) is enough to see *all* the balls...’ (Dretske 2010: 59; my emphasis). There can be a premature objection that in this discussion, Dretske does not stipulate enough to sustain his case. For example, he does not say where we should fixate, and he is very relaxed about how long we see the two figures. Given these, the argument goes, the case does not differentiate Dretske’s view and versions of the sparse view such as Michael Tye (2010).¹⁹ In two seconds, we will have six to eight saccades, and we can do many voluntary eye movements if we want. Presumably, the reason why Dretske is so flexible about his descriptions is that he thinks even if we do it very quickly, we will still see much of the detail, but this causes a problem: Dretske provides absolutely no constraint on fixation points and where to direct one’s attention, and in two seconds we can see very much by moving our eyes and directing our attention. Given this flexibility, no wonder we see so much detail even when there are more than forty balls in front of us. What’s more, how far should we view the figures? Distance does matter; if you view these figures from, say, two feet away, the character of your experience will be very different from the experience you get when viewing it from five inches away. Given Dretske’s presumptions that we read the book from normal reading distance for two seconds, it might be fair to say that we see much of the detail, probably every ball. This is not controversial, but at the same time not very interesting: given that you have two seconds with no required fixation point, no wonder you can see all the details. Even a sparse theorist can agree with this.

Now, this is a premature objection because it misunderstands what Dretske is aiming at here: he is describing an observation from daily life, i.e., when there is a group of items in front of us, we can very quickly see every one of them with quick glimpses. The premature argument is based on an uncharitable reading of Dretske. A more suitable understanding of the dialectic

¹⁹ This premature argument is raised by myself in an earlier version of this chapter.

should be this. As Tye puts it, the two competing hypotheses are ‘representational failure’ and ‘comparison failure’:

[F]or at least some change blindness scenarios, we should accept the REPRESENTATIONAL FAILURE hypothesis at a conscious level as opposed to the COMPARISON FAILURE hypothesis at that level. The first hypothesis is self-explanatory; the second is the view that change blindness results not from a failure to see anything in the field of view but rather from a failure to compare properly conscious representations of the scene before and after the change (2010: 420)

As Tye implies, there are different kind of change blindness scenario, and what he has in mind is the one shown by figure 1 and 2 above. His view is that we *do not* see the ball that is missing in figure 2 in most cases; Dretske’s view is that we *do* see it at least in some cases when we glimpse through the scene, and it is just that we fail to compare figure 1 and 2 in that regard. The opposition seems to be clear enough. However, here we risk talking past each other. As explained above, the fact that Dretske here does not stipulate a fixation point and so on shows that he is only registering an observation from daily life, namely that normally when there is a group of items in front of us, we can quickly skim through the scene and cover most of them. However, in Tye’s discussion, fixation and other related considerations are prominent. For example in illustrating his points he uses this figure:

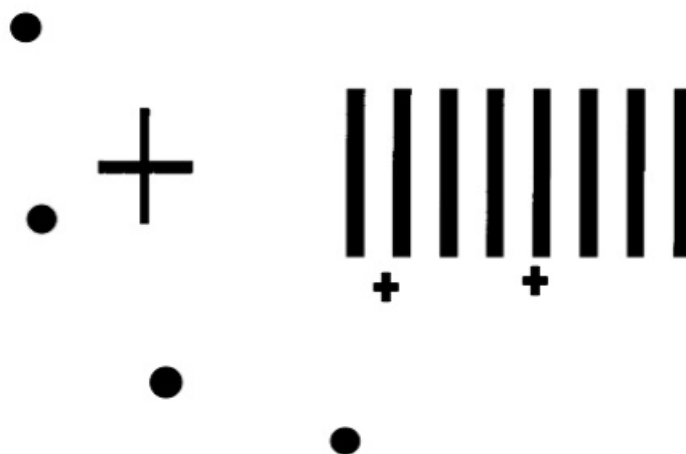


Figure 3

Here dots and crosses are used as fixations points and vertical lines are targets. It is fine in doing this, but we need to note that in doing so we are no longer dealing with the same kind of case. In Dretske's original case, there is no regulation about fixation, while in Tye's case there is. We can of course talk about different cases in discussions, but we need to note the differences between cases when we go along. Dretske can well agree that in figure 1 and 2, if we fixate at a point that is far enough from the crucial ball in the right, we do not see it. His view is that we *do* see it sometimes when we are allowed to glimpse through the entire scene, i.e., without fixation, even if afterwards we fail to identify the difference between the two figures. The distinction between two kinds of failure from Tye does make sense, but the application of them here can only be indirect, since there are two cases here, one with and the other without fixation.

For our topic here, i.e., the relation between attention and visual demonstratives, it is helpful to consider both cases. Let's start from Dretske's case that does *not* involve fixation. In this case, one runs through the scene and takes in most balls. Some balls will be foveated, some not, but being seen does not require being foveated. When seeing them, one can entertain a demonstrative thought employing, 'this ball,' directed to a given target. In doing so, one's attention, both the selection and the access aspects, is operative: one needs to not only *select* the target, but also *access* it so that one can use the demonstrative in question to form beliefs about the target. When one sees that crucial ball in figure 1, one can also apply a demonstrative to it. But since it looks exactly the same as its fellows, there is no reason why one can identify its absence in figure 2. Perhaps sometimes we do by chance, but often we would not. Here we can say that it is a case of *comparison* failure, since even if one does see the crucial ball and form a demonstrative for it, one can still miss the difference in figure 2. In Tye's case, in which we still have figure 1 and 2 in front of us, but with our eyes fixating at a point where it is far enough from the target, one cannot form a demonstrative thought about that crucial ball in figure 1, so the failure in question is a *representational* failure, i.e., one cannot

even see the crucial ball because it is too peripheral in one's visual field.²⁰ Since it is too peripheral, one cannot select it, let alone access it and conduct further rational acts.

Therefore, it seems that Tye's objection to Dretske is a misfire: in Dretske's case he allows viewers to skim through the scene by moving their eyes, while Tye stipulates that we fixate at some point. Unless Tye shows that Dretske's way of describing the case is illegitimate for certain purpose, which he does not, we should simply acknowledge that they are different cases that might show different but perhaps consistent results. This leads us to think whether there is any interesting moral from this debate. I believe there is at least one, namely the importance of location of objects for visual demonstratives. In Dretske's case, the fact that we need to move our eyes to see more balls shows that in some way location is quite important: locations are spatial properties and movement is a major way to track spatial properties. In Tye's case, where viewers have to fixate at a point, they cannot see certain object, e.g., the crucial ball in Dretske's figure, exactly because the location of that object is too peripheral in relation to the fixation. It seems that the importance of location for visual demonstratives is beyond doubt. The question is *how crucial* and *in what way* it is.

An effective way to approach this question is to examine an extreme view, e.g., the view that *getting the target's location right is necessary* for applying visual demonstratives to it. John McDowell seems to hold this view when he writes:

[W]hen a subject's perceptual experience places an object for him, his statement 'It's over there' (say) can count as expressing knowledge on his part of where in the world the object is, even if he is lost... This is what enables his thinking to home in on the object, in a way that depends directly on the object's location in the objective world. (McDowell 1990: 257)

²⁰ Here we assume, with Tye, a representational view of seeing for the sake of argument, but this assumption is not essential to our discussion here.

When McDowell writes ‘even if he is lost,’ it looks like the requirement is going to be very low. However, towards the end he asserts that the *object’s location in the objective world* is crucial, and this imposes a strong requirement for perceptual demonstratives: the subject *has to* get the object location correct in order to successfully apply perceptual demonstratives to it. This is as strong as one can get in this context: an object’s *actual*, correct location is essential to one’s ability to apply demonstratives to the target. This view of McDowell is inherited from his reading of Gareth Evans (1982) on information links. For our purposes I do not wish to enter into interpretative issues here. I propose we consider a straightforward objection from Peacocke that this view is implausible since it does not sit well with our ‘pre-theoretical intuition’ (1991:123-4). As he acknowledges, intuitions ‘can always be overruled by theory’ (ibid.: 124); the question is when we should prefer the intuition over the theory that is incompatible with it. In the present context, consider the case in which one clearly sees an object but does not get its location exactly right. Is there any reason to say that one thereby cannot apply demonstratives to it? It is not clear that there is. If one can mark the target out in one’s visual phenomenology, i.e., if one can differentiate it from its background, why can’t one apply visual demonstratives to it? When I get a person’s properties wrong, e.g., I misidentify someone’s gender, I certainly can keep track of the person visually. Applying visual demonstratives does not seem to require any stronger condition, such as getting the objective, correct location right.²¹

These considerations are relevant to our understanding of the Sperling case for this following reason. In the case in which one is cued to attend the upper row, although one would not be very good at reporting letters in uncued rows, especially the lower one, one would still be able to exercise visual demonstratives for letters one cannot report on, as long as one can roughly get their locations. Also, in the *full* report condition, in which participants just freely recall what they saw during the trials, they might be able to report accurately for roughly four letters, but get their locations seriously wrong. For example, they can correctly think ‘that letter is “K”,’ but misperceive or misremember its location. This further supports the more intuitive position

²¹ Campbell argues for a view similar to mine (2002: 46).

that demonstratives do not require the subject to get the location of the target exactly right.

This ends what we need to say about the relation between visual demonstratives, attention, and the Sperling paradigm, amongst other things. There is a serious debate about whether attention is necessary for employing or understanding demonstratives, but in order to stick to the main line I bypass it for now. In next section I will explore another aspect of seeing.

4.2 The Grain of Vision and Attention

In order to understand what this additional aspect of seeing is and why it is relevant to the main line of this study, we need a small digression. In a similar but different debate, there is an issue concerning whether seeing is partially or even entirely conceptual. For those who argue for nonconceptual seeing, they often invoke the idea that seeing is rich or fine-grained in ways that our conceptual repertoire cannot capture. Now as Tye (2006) points out, we should carefully distinguish between the richness and the fineness-of-grain arguments. The former is about quantity, while the latter quality. The former argument is something like, ‘the *quantity* of information that is exhibited in vision is *richer* than that available in concepts.’ The latter argument, by contrast, should be something like ‘the *quality* of information that is exhibited in vision is *finer* than that available in concepts.’ For example, something can carry a huge amount of information (rich), but differences within those pieces of information might be very salient (not fine-grained), or the other way around. Richness and fineness-of-grain are different notions, so they constitute different argument against or for a certain view.

Now the topic of this essay is attention rather than conceptual thought, but these above notions are applicable to cases we are considering as well. First, in figure 1 and 2 we have a large number of balls for one to take in with a glimpse, but since it is obvious that they are all qualitatively identical, or at least close to identical, the fineness consideration does not apply. Secondly, the Sperling paradigm is often taken as a version of the richness argument, for example Tye (2006), Dretske (2006), and Block (2007b), but it is also related to the fineness consideration, since the letters can look quite similar to certain

other letters, but not that similar to some others. For example, as discussed above one's phenomenology might be neutral between 'E' and 'F,' but it can clearly rule out 'K.' If the experience in question is even more specific, for example if participants are allowed to look at the stimuli for a longer duration, the visual phenomenology might be finer-grained so that it can decide between 'E' and 'F,' but cannot do better, e.g., cannot differentiate between different fonts. Therefore the fineness-of-grain aspect of seeing is also important in understanding phenomenal specificity in the Sperling case, and more generally, visual knowledge. In the remainder of this chapter I will attempt to understand this notion.

Block (2012, 2013) provides good materials in this regard. Just like in his discussion of Sperling, his main concern is the relation between visual attention and consciousness. In this new pair of papers, he focuses on 'the grain of vision and the grain of attention' (2012: 170). By 'grain' he means 'minimal resolution' or 'minimal *spatial* areas'/'windows of integration' (ibid.: 170-1; my emphasis). This is not exactly the same as what we mean by 'grain' above or in other contexts when philosophers talk about fineness-of-grain. For example, when Evans proposes his version of the argument, he writes:

Do we really understand the proposal that we have as many colour concepts as there are shades of colour that we can sensibly discriminate?
(Evans 1982: 229)

In that case, what he has in mind are shades of colours: we can discriminate between some shades of colours, but without having any corresponding concept. This is different from what Block is engaging with, which is a spatial notion. However, we can regard both Evans' case and Block's case as special cases of grains, i.e., colour grains and spatial grains respectively. Both colour properties and spatial properties can be exhibited in vision, so we have corresponding notion of grains. Now for our purposes Block's case is more relevant, since in understanding the Sperling case colours are out of question, but we should acknowledge that grains could have many kinds, though in the present context we will focus on spatial grain. I will come back to Evans's dialectics in the next section.

When Block introduces his notion of grain of vision, he contrasts it with ‘grain of attention,’ defined as follows:

The minimal spacing (in terms of angle from the eye) at which subjects can do *this* reliably is called the grain of attention. (Block 2012: 174; my emphasis)

By ‘this’ Block refers to the ‘stepping’ task concerning attention introduced by Patrick Cavanagh et al (2001). Block then continues:

We could define a corresponding notion of grain of vision in terms of whether, in uncrowded fields, the subject can *distinguish* one dot from two dots, or whether the subject can detect a gap between two discs. (Block 2012: 174; my emphasis)

To understanding these notions, we need to note that Block’s context here is crowding and peripheral vision, as he makes clear at the beginning of the 2013 paper. This is most relevant to figure 3 above provided by Tye, where one is required to fixate at a point and try to pay attention to targets in one’s peripheral visual field. Tye’s view is that in that case we do not see certain bars individually, but only collectively. For Block to make his case, he needs a stronger view that we see a certain target individually, but cannot attend to it. How can we make this view plausible?

The issue hinges on which sense of seeing we should use here. Everyone should acknowledge that there are different senses of seeing and one can pick a certain sense for one’s purposes, but at the same time allows others to use difference senses for other purposes. Block points out that in seeing something, at least in a relatively tenuous sense, there is no need for one to be able to identify that thing (2012: 180). For example in trials in which the stimuli appear very shortly, one can fail to capture any interesting property of the target, and thereby fail to identify what the target is. However, it is still plausible to say that one sees the target, though not clearly at all, so that one cannot provide any further information about the target. To be sure, others can stipulate a thicker sense of seeing so that it requires identification for a

different purpose, but Block's sense of seeing here, though tenuous, should be regarded as legitimate.

How about attention then? Block invokes the stepping task from Cavanagh et al (2001) to show that in cases such as figure 3, one can (tenuously) see an individual bar but fail to attend to it. In order to be more focused, I do not engage his argumentation here; instead I go back to where we started in this chapter, namely the distinction between selection and access. According to our usage, both selection and access are aspects of attention; they are different notions, but this does not automatically prevent them from being attention. Now in cases like figure 3, can average human subjects select or even access an individual bar in the middle with the fixation at the left? Let's look at selection first. Recall that in our usage of selection, it is defined in information processing terms. Overall this fits better with the psychology literature. Now, in figure 3 the information about middle lines certainly go into observers visual systems; this is why people can detect whether there is incongruence amongst stimuli. However, people fail to mark it out in phenomenology and make use of it to report (e.g., I am now stepping to the third one), so they have no access to it in the sense defined above. This chimes well with our adoption of Campbell's 2011 view, namely that selection goes with seeing. To have access to something is more demanding and therefore a further story. To keep clear about which sense of attention we are operating with is crucial in every step of our argumentation.

4.3 Fineness of Grain

In this final section, I briefly return to the fineness of grain consideration raised in Evans (1982), since it also helps us understand the nature of visual demonstratives. Here once again we encounter a debate between McDowell and Peacocke. In *Mind and World*, McDowell opens Lecture I by saying that '[t]he overall topic I am going to consider in these lectures is the way concepts mediate the relation between minds and the world' (1996: 3). For our purposes we do not need to enter the larger debate concerning what a theory of concept is supposed to do, e.g., whether we should avoid any circularity in the theory

(Postscript to Lecture III). I will focus on their disagreement in Lecture III concerning demonstrative concepts. McDowell introduces the context like this:

One consideration that impresses Evans is the determinacy of detail that the content of experience can have. He claims that this detail cannot all be captured by concepts at the subject's disposal. 'Do we really understand the proposal that we have as many colour concepts as there are shades of colour that we can sensibly discriminate?' (McDowell 1996: 56, quoting Evans 1982: 229)

McDowell's response to this involves his idea about demonstrative concepts:

But why should we accept that a person's ability to embrace colour within her conceptual thinking is restricted to concepts expressible by words like 'red' or 'green' and phrases like 'burnt sienna'? It is possible to acquire the concept of a shade of colour, and most of us have done so. Why not say that one is thereby equipped to embrace shades of colour within one's conceptual thinking with the very same determinateness with which they are presented in one's visual experience, so that one's concepts can capture colours no less sharply than one's experience presents them? (McDowell 1996: 56-7)

This 'demonstrative concept' strategy of course needs defence. 'We can ensure that what we have in view is genuinely recognizable as a conceptual capacity if we insist that the very same capacity to embrace a colour in mind can in principle persist beyond the duration of the experience itself' (ibid.: 57). McDowell calls this 'recognition capacity,' which is 'possibly quite short-lived' (ibid.: 57).

McDowell's strategy here is designed to cope with the objection that concepts are not as fine-grained as visual experiences are. However, he faces the opposite charge that 'these demonstrative concepts slice too finely':

Consider 'that shade,' 'that red,' 'that scarlet.' These are all different conceptual contents. It seems to me [i.e., Peacocke] quite implausible

that just one of these, and not others, features in the representational content of experience of a shade of red. (Peacocke 1998: 382)

Again, we are bracketing the question whether experiences possess representational content. The challenge remains. To this challenge we might reply, on McDowell's behalf this time, as follows: it is true that there is no principled way to privilege any demonstrative concept, but for the purpose of capturing the grain of vision, we can simply use 'that shade,' or maybe 'that colour.' Individual perceivers can have finer concepts or not, but as long as they share the concept of 'that colour' that is fixed by the relation to the target, we do not need to worry about the opposite challenge raised by Peacocke.

Although I do not subscribe McDowell's conceptualism, I find this aspect of his thought appealing. One might wonder that if I am in general agreement with McDowell with regard to answering the fineness of grain argument, how can I avoid his conceptualism? Here we need to make a distinction between characterising and constituting experiences. If concepts are not fine-grained enough to *characterise* experiences, it follows that they cannot *constitute* the contents or phenomenology of experiences. McDowell's conceptualism requires the constitution claim, which entails the weaker characterisation claim. Now the fineness of grain argument targets the weaker, characterisation claim. Even if McDowell can satisfactorily answer that challenge, it does not thereby vindicate the constitution claim, because it is stronger (i.e., affirming the consequent cannot license us to affirm the antecedent). My view is that the fineness of grain argument does not refute the characterisation claim, as McDowell argues, but since I do not further accept the constitution claim, there is no commitment to conceptualism.

The view that demonstrative concepts can capture the grain of vision is closely related to some issues in epistemology. For example, there is a form of question that goes like this: given that experiences are so fine-grained/rich, or given that they are analogue in character, how do we account for their rational linkages to beliefs that are less fine-grained/rich or are digital in character? To argue that demonstrative concepts are fine-grained enough to capture experiences is the first step towards giving an account of epistemic, rational

linkages. This is a further step towards the larger project in the background, that is, understanding visual knowledge.

After digressing for a while, let me summarise the overall structure of the thesis. It starts with the observation that at least in many cases, the relation between perceptions to beliefs involves the transition from the imagistic to the propositional (Introduction). Sperling's iconic memory partial report paradigm epitomises this transition. In order to understand what involves in the Sperling case, Block invokes a notion of specific phenomenology to sustain his view that what we are conscious of are richer than what we attend to at a given moment (the rich view). His characterisation of specific phenomenology, however, is unsatisfactory (Chapter 2). I propose that we invoke Peacocke's notion of the analogue and other apparatuses to model this phenomenal specificity. In particular, the idea that perceptions are imprecise is captured by the notion of matching profile (Chapter 1). It is argued, with resources from Phillips, that attention can modulate matching profiles: attention can narrow down the ranges of matching profiles so that the phenomenology for the cued row becomes specific enough for accurate reports (Chapter 3). From this, to reach visual knowledge we need visual demonstratives to be operative (Chapter 4). Since the narrative above is sometimes not very straightforward, the summary serves as a reminder about what we have covered in the thesis.

CONCLUSION

The Road Ahead

C.1 Remaining Empirical Issues

In the main body of the essay, in order to pave the way for the key notion ‘matching profile’ and its application to the Sperling case, I spent most space motivating it and explaining how it works. In doing so, the engagement with what Block actually says concerning relevant empirical issues is minimal. In the first section here I discuss his follow-up ideas in the 2011 paper and explain how my position can cope with these new points. Also in that piece he discusses his opponents’ views, such as those from Stazicker and Phillips, so this also gives me a chance to compare my own view and theirs.

A key move in this paper is to draw a three-way distinction between kinds of visual short-term memory:

- a) Rod-based pure iconic memory (lasting at most a few hundreds msec)
- b) Fragile VSTM (4-5 seconds)
- c) Working memory

This move takes us beyond the original Sperling experiment in that in the old paradigm item a and b are not kept apart. However, given that what Block and his opponents are interested in is phenomenal consciousness, any rod-based

memory should be discarded. Kouider et al. (2010) uses a mask to do just that. In doing so, even with the assumption Block makes, i.e., we can sum reports in different trials, the result is still ‘only 1.47 out of 4 items in each row...not much above the capacity of working memory’ (Block 2011: 569). This is the main ground for Kouider et al. to deny the rich view. Block’s reply here is that ‘the fragmentariness demonstrated may be due to the icon being diminished by low contrast stimuli and a mask’ (ibid.: 569). He prefers the method from Sligte et al. that uses ‘an isoluminant stimulus...since it is invisible to (color blind) rods, which are the main source of retinal persistence’ (ibid.: 569). The idea is that perhaps’ the mask used by the Kouider group wipe out not only retinal iconic memory but also some parts of fragile VSTM. To evaluate these methods goes beyond the scope of this essay, but in order to take issue with Block we may go with the method he prefers, i.e., the one offered by Sligte. What should we say about this three-way distinction and its relation to the original dialectic?

First, some might be sceptical about the entire discussion around Sperling. The scepticism goes like this: at least for Block’s aim, i.e., demonstrating that phenomenal consciousness is richer than access, Sperling’s case is useless because it crucially fails to differentiate retinal persistence from fragile VSTM. The entire discussion of Sperling between Block and his opponents is useless. In replying to this sceptical view, I would say that it goes too far. It is true that if what is at issue is between fragile VSTM and working memory, then any paradigm that fails to distinguish between fragile VSTM and retinal persistence would be non-ideal. However, from Block’s opponents’ point of view, if they could make the case against Block even with the Sperling paradigm, then they are indeed in a very good shape, since the Sperling paradigm conflates retinal persistence and fragile VSTM, which is good for the rich view. Therefore, the right conclusion to be drawn is that the discussion of Sperling is still useful, though both sides need to move onto new paradigms to make progress since those new paradigms seek to discard an irrelevant element – rod-based pure iconic memory.

The second point is related to the distinction between selection and access. Earlier we have noted that while psychologists often emphasise selection, philosophers talk more about access when theorising about attention.

This might be due to the fact that philosophers are much more obsessed with knowledge and rationality, and access as they define it is more suitable for this epistemic purpose. Now, there is a danger of talking past each other here: psychologists also talk about a similar notion of access, but when they do so what they have in mind is often working memory, not attention. For example Bernard Baars's global workspace theory of consciousness uses information accessed by working memory as the criterion for consciousness (1988). In this 2011 paper, Block explicitly sets up the dialectic with varieties of visual *memories*. If so, one might wonder whether we have changed the topic. But again I believe we can draw a more optimistic conclusion here. It is true that attention and working memory are different²², so if at the beginning the debate is about the former and now it is about the latter, we need to reconsider the dialectic. However, what is always at issue is access as Block and maybe Campbell define it. So there is a crucial point for disagreement. To identify access with attention is a further, and perhaps to some extent verbal move. What is crucial is to make clear what the disagreement is. If we stick to the notion of access as Block and Campbell define it, then we can still have the debate clearly in view. Finally and very briefly, above we stated with Block that fragile VSTM can last for 4-5 seconds, and if so it lends support for Block's rich view. But we need to note that this point is from the Amsterdam group that Block always favours, so readers need to decide for themselves how much they buy into this result.

What is the main contention of this 2011 paper from Block? It is the idea that 'the postulation of unconscious highly detailed iconic memory is unmotivated' (ibid.: 574). In the paper he classifies his opponents into two groups, the 'generic illusion' and the 'fragmentary illusion.' This following formulation captures the cores of these two views:

Generic Illusion: 'generic consciousness combined with unconscious iconic memory' (ibid.: 568)

Fragmentary Illusion: fragmentary consciousness combined with unconscious iconic memory.

²² Alan Allport (2011) has pointed out the empirical difficulty in teasing apart this pair of notions, but still, at least they are conceptually distinct.

There can be several complications here. For example, even for those who are classified as holding one view, say generic illusion, there is still room for debating about the nature of being *generic*. The same goes for the other hypothesis. Stazicker (2011) explicitly holds the generic version, while it is more difficult to classify Phillips's view (2011). However, they share the view that it is *unconscious iconic memory* that sustains people's cognitive performances. And this is where my view crucially differs from theirs. Here I partially side with Block that '[t]here has been one direct test of the power of unconscious working memory...[by Soto et al. which] suggests it is too weak to explain the memory of up to 5 oriented rectangles for up to 4-5 seconds in the Amsterdam paradigm' (Block 2011: 573-4). My endorsement of this is only partial because as discussed above, there might be question about the Amsterdam group's result. But at least it shows that unconscious memory might not be as powerful as some theorists have thought. This echoes with Block's complaint towards the end of that paper that some tend to think that hypotheses invoking unconscious memory seem to have certain default status (*ibid.*: 574), but it is not clear this should be the case. In this crucial aspect, my own position is closer to Block's in that before the cue, consciousness has a higher capacity than access.

However, there is another aspect that my view is more similar to Phillips's. It is the idea that Sperling's case might involve postdiction. I believe Phillips (2011) has made a convincing case for its initial plausibility, as we have reviewed in Chapter 3. Stazicker (2011) denies that he shares this view by saying that '[his] interpretation doesn't require any *retroactive* effect of attention on conscious experience' (169), but for one thing, 'doesn't require' does not mean that it is actually not the case; for another, given that the cue comes in only after the stimuli offset, it is not clear how he can prevent a certain version of the postdiction interpretation. Very often when I present my view on these matters, people ask how different my view is from Stazicker (2011) and Phillips (2011). To the extent that they hold postdiction for the Sperling case (though Stazicker would deny this), my view is in the same camp with theirs. But as stated above, the crucial difference is that while they hold that what is really doing the work is unconscious iconic memory, I side with Block that

consciousness might do more works in this regard. Again my view is that before the cue participants have analogue phenomenology with larger matching profiles, say neutral between ‘E’ and ‘F’ in one location, but after the cue attention retrospectively or postdictively narrows down the profile so that now it can sustain accurate reports for the identity of the letter in question. It is postdiction, but what attention does in my picture is *not* bringing unconscious information into consciousness; rather the change happens at the conscious level: the wider matching profiles are conscious in the first place.

There are many empirical issues that have been raised and discussed on this topic, both by Block and by others, that I cannot cover in this essay. But I believe the above discussion should be minimally enough to differentiate my view from others so that readers may find it easier to keep track of the fine structure of the dialectic. In section 2 I continue this line by briefly discussing some empirical issues concerning discrimination and just noticeable difference.

C.2 Analogue Magnitude and Supervaluation

In cashing out how the notion of matching profile can help us understand the Sperling experiment, one notion of analogue is invoked to construct the model. In that discussion I mentioned that there is a root of that line of thought in psychology, but I did not go into the details in that area due to the space limit. This can be another future direction. One example comes from animal studies. A study conducted by Mark Rilling and Colin McDiarmid (1965) on pigeon’s number sense is instructive. The general result is that pigeons are quite reliable in discriminating the numerical values of two sequences of pecks until the ratio exceeded 9:10. Later similar results are shown in different species, including human infants (Xu and Spelke 2000). These discriminative capacities obey ‘Weber-Fechner Law,’ which says that the just noticeable difference between two stimuli is proportional to the magnitude of the stimuli, i.e., the ability to discriminate two magnitudes is a function of their ratio. The discussions and applications of this law in psychology have been well established, but exactly how we can extend it to my view of Sperling is not entirely clear. One complication is, again, how we understand the relevant notion of analogue here. ‘Analogue magnitude’ in the psychology literature does not match what many philosophers mean by ‘analogue.’ For example, Lewis (1971) suggests that

analogue representations should be primitive in the language of physics, but according to the psychological usage, nothing like this constraint is required. Similar holds true of Dretske's and Goodman's notions. In drawing connections to the empirical literatures, it is crucial to make sure that we do not talk past to one another. This is one crucial step in this project, but it goes beyond the scope of this piece.²³

Another possible connection in this regard is vagueness and supervaluation in philosophical logic. More specifically, the idea of supervaluation is a response to the 'sorites paradox.' Basically it reflects a certain kind of indeterminacy concerning applications of predicates that lack precise boundaries, such as 'being bald': it is not clear that there is a determinate answer to the question whether a specific person is bald given the amount of that person's hair. This vagueness phenomenon is arguably one of the thorniest problems in philosophical logic and philosophy of language. Although it is not obvious, there might be some relevance to theories of perception. Here we discuss only one response to vagueness, namely supervaluationism. We can trace the idea back to Bas van Fraassen (1966), with later developments by Michael Dummett (1975) and Kit Fine (1975). One of the most salient characters of this approach is non-bivalent logic, i.e., logic with more than two values (typically true and false). To say this is a *semantic* view of vagueness is to contrast it with other views, such as the *epistemic* conception, which has it that vagueness in a significant sense *not real* (Williamson 1994). The semantic view confronts the problem by semantic analysis: one crucial question here is that the predicate in question neither *definitely* applies nor *definitely* does not apply, and the view offers a semantic analysis to 'definitely.' Roughly, the objects that the predicate definitely applies fall in its positive extension, while the objects that the predicate definitely does not apply fall in its negative extension. The remaining ones are borderline cases, and they fall under the predicates' *penumbra*, i.e., cases in which the predicate in question is neither true nor false. Now, supervaluationists invoke a notion of 'super-truth': 'if every way of making a valuation more precise by dividing up the borderline cases between the positive extensions and the negative extensions results in a fully precise valuation in which the sentence comes out

²³ For a more substantive discussion of these issues, see Beck (2012).

true, then that sentence is supertrue' (Barker 2005: 9-10). The opposite can be said to 'superfalse.' This is roughly how supervenience goes about in explaining vagueness.

Now how does this bear on perception? Recall that the very idea of matching profile involves a range of magnitude, such as length, size, and so on. It is argued that it is analogue in character because unlike *many* beliefs, which are digital in being either true or false, *every* case of perception seems to be imprecise by their very nature: most cases are quite close to veridical, but perhaps *never* perfectly veridical given the human discriminatory capacities are imprecise. If this is so, the matching profile model of perception seems to echo what supervenience has to say about vague predicates. It is helpful to think this way because in saying that perception are vague, indeterminate, or imprecise, one wants to have a model to substantiate the claim in question, otherwise the claim, even if true, might turn out to be quite vacuous. Supervenience is a well-developed theory of vagueness. There is a question about whether it is true in the case of language, and even if so, whether there is any interesting application to perception. This present inquiry does not provide answers to these difficult questions, but this seems to be yet another interesting future direction for us to pursue.²⁴

C.3 Rationality

In this final section, I briefly discuss the final step towards an understanding of visual knowledge, the larger project in the background. Just to rehearse the disclaimer, I do not here commit to the view that beliefs plus rational entitlement are sufficient for knowledge. There are other possible elements, such as avoidance of epistemic luck. But it is safe to assume that entitlement must somehow play certain role in the formation of knowledge. It is part of the very idea of knowledge. Otherwise it is difficult to distinguish knowledge from mere true beliefs.

It is a tempting idea that a function of consciousness is to facilitate rationality in some sense. Consider blindsight again. Intuitively, the key difference between patients with blindsight and normal perceivers is that they lack awareness in the blind fields, and that explains why it is only normal

²⁴ For a recent effort in this regard, see Perkins and Bayne (2013).

perceivers who are entitled to the claim of knowledge. There may be something true about this picture, but it cannot be this easy. There has been powerful scepticism about linking consciousness and rationality in this way, for example from David Rosenthal (2008). In this section I evaluate this scepticism.

Rosenthal first registers the reason why the idea that rationality is a function of consciousness looks so compelling:

Because the consciousness of thinking and perceiving is *subjectively central* in our lives, it is intuitively inviting to assume that their being conscious has some significant function. (2008: 831; my emphasis)

However, he has a principled argument against any such idea.²⁵

The rationality of thoughts and desires is a matter of their *intentional content*. Rational thoughts and desires have intentional content that reflects *rational connections* among those states, and with behavior and the environment as the organism perceives it. These connections are both *necessary and sufficient* for the relevant thoughts and desires states to be rational. They are what rationality consists in. (ibid.: 832; my emphasis)

This argument is not without its initial plausibility. Consider a historical observation of 20th century analytic philosophy: when philosophers such as Donald Davidson (1984) theorised about meaning and rationality, consciousness was very often left out of the picture. Even for those like Dennett who work both on content and consciousness, the discussions of them are by and large separate. For example consider the idea that only the intentional stance can help us understand a creature's rational behaviours properly (1989). In that discussion, consciousness does not play any significant role. It seems that the rationale that underlies these approaches is something like the argument epitomised in the passage from Rosenthal, i.e., the idea that

²⁵ Rosenthal also invokes some empirical studies to back up his position. To look at those and other related studies would take us too far afield, so here I only discuss his conceptual argument.

inferences are between semantic relations that are exhausted by semantic contents. On this picture, consciousness is simply irrelevant.

What I want to challenge about this picture is the *sufficiency* claim, i.e., semantic relations or connections are sufficient for rationality. Consider an uncontroversial point that people usually if not always hold beliefs that are inconsistent with one another. To remedy the situation, we need to bring them into the person's purview and explain why there are inconsistencies involved. Semantic rules do not work like physical laws: in the physical domain, it is the case that for medium-sized objects, they cannot occupy the same location at the same time. This governs the physical domain *automatically* without being monitored by any agent. But it works differently when it comes to intentional contents. It is true that there are *objective* relations between those contents that are subject to normative rules and are independent of consciousness, but they govern only what *should* happen, not what *actually* happens. At least sometimes, consciousness needs to come in to put target beliefs on the table so that we can think about them explicitly. Rosenthal is right in arguing that consciousness is actually much less important than most people expect, but his position turns out to be too strong. At least under certain circumstances, consciousness can do something for us concerning rationality.

Rationality, knowledge and epistemology in general are very relevant to the current project but there is no space for me to develop my views on this occasion. Here are two possible developments. The first is to consider Williamson's anti-luminosity argument (2000). His definition of 'luminosity' in the relevant sense is this:

A condition is *luminous* means 'whenever it obtains (and one is in a position to wonder whether it does), one is in a position to know that it obtains. (2000: 13)

Williamson's target here is the view that 'one is always in a position to know whether one is in them' (ibid.: 13), and he calls this target '*accessibility* requirement' (ibid.: 13; my emphasis). If we apply this to phenomenology, his target becomes the view that whenever a mental episode or state is phenomenal, the subject is in a position to know that it obtains. Now, perhaps

my view is immune to this threat anyway, since I accept the distinction between selection and access, and I do not hold that whatever selected in experience is accessed, even assuming that what we mean by ‘access’ is similar enough to Williamson’s meaning, my view does not commit to the idea that one is always in a position to know whether one is in those mental states. Still, it seems to be relevant enough so that if there is more room, it can be a direction of exploration.

The other direction is the relation to McDowell’s discussion of the Myth of the Given (Sellars 1956, McDowell 1996). Basically, it seems to be quite relevant because McDowell explicitly classifies any version of non-conceptualism into the Myth of the Given, and if so my current view lies into the camp as well. The Given theorists hold that experiences are confined in the realm of law, which is different in kind from the space of reasons, but they still want experiences to do rational works for us. Here I tend to agree with McDowell that this is indeed a view one wants to avoid. However it is a further claim that the space of *reason* is co-extensive with the space of *concept* (McDowell 1996). The Myth of the Given, as such, does not speak to issues about concepts. Therefore in acknowledging that the current picture is a version of non-conceptualism, we do not thereby fall prey to the Myth of the Given. As Peacocke observes, ‘[i]t is an *additional* thesis, incorporated into the formulation of the Myth of the Given in Sellars, McDowell, and Brandom, that all representational content is conceptual content’ (2010: 191; my emphasis). That additional thesis might turn out to be true, but it needs additional arguments. Therefore I believe that as it stands, the current picture of visual knowledge avoids the Myth of the Given at least on the face of it.²⁶

I shall end this essay here. The major topic of it, again, is phenomenal specificity. Block’s notion ‘specific phenomenology’ is invoked to sustain his interpretation of the Sperling paradigm. In Chapter 1 and 2 I have tried to explain why his position is no good and we need to use the analogue and matching profile to have a better understanding of phenomenal specificity. Chapter 3 moves on to attention and argues that under suitable circumstance attention can postdictively narrow down matching profiles. Chapter 4 further

²⁶ In the previous version of the thesis I have fuller discussions of both Williamson and McDowell, but for practical reasons in this final version I keep the discussions of them minimal.

discusses other aspects of phenomenal specificity by considering different cases. Now in this conclusion I attempt to discuss some future research directions, including empirical, linguistic, and epistemic ones. They are unsatisfactory by nature: after all, they are directions for *future* researches. However, I hope this way of ending the essay can show that the concern of phenomenal specificity has much larger impact and relevance than it might originally seem.

BIBLIOGRAPHY

- Allport, A. (2011) 'Attention and Integration,' in C. Mole, D. Smithies, and W. Wu (eds.) *Attention: Philosophical and Psychological Essays*, Oxford University Press
- Alpern, M. (1953) 'Metacontrast,' *Journal of the Optical Society of America* 43: 648-57
- Ayers, M. (1993) *Locke*, Routledge
- Baars, B. (1988) *A Cognitive Theory of Consciousness*, Cambridge University Press
- Bachmann, T. (1994) *Psychophysiology of Visual Masking: The Fine Structure of Conscious Experience*, Hauppauge, NY: Nova Science Publishers
- Barker, C. (2005) 'Vagueness,' in Brown, K. (ed.) *The Encyclopedia of Language and Linguistics*, 2nd Edition, Elsevier Science Ltd.
- Beck, J. (2012) 'The Generality Constraint and the Structure of Thought,' *Mind* 483: 563-600
- Block, N. (1995a) 'On a Confusion about a Function of Consciousness,' *Behavioral and Brain Sciences* 18(2): 227-72; reprinted in his *Consciousness, Function, and Representation*, MIT Press
- Block, N. (1995b) 'How Many Concepts of Consciousness?' *Behavioral and Brain Sciences* 18(2): 272-87; reprinted in his *Consciousness, Function, and Representation*, MIT Press
- Block, N. (2007a) *Consciousness, Function, and Representation*, MIT Press
- Block, N. (2007b) 'Consciousness, Accessibility, and the Mesh between Psychology and Neuroscience,' *Behavioral and Brain Sciences* 30: 481-548; reprinted in his *Consciousness, Function, and Representation*, MIT Press
- Block, N. (2007c) 'Overflow, Access, and Attention' *Behavioral and Brain Sciences* 30: 530-548; reprinted in his *Consciousness, Function, and Representation*, MIT Press
- Block, N. (2011) 'Perceptual Consciousness Overflows Cognitive Access,' *Trends in Cognitive Sciences* 15(12): 567-75
- Block, N. (2012) 'The Grain of Vision and the Grain of Attention,' *Thought: A Journal of Philosophy* 1(3): 170-84

- Block, N. (2013) 'Seeing and Windows of Integration,' *Thought: A Journal of Philosophy* 2(1): 29-39
- Brockmore, J. R., Wang, R. F. and Irwin, D. E. (2002) 'Temporal Integration between Visual Images and Visual Percepts,' *Journal of Experimental Psychology* 28(2): 315-34
- Broadbent, D. E. (1952) 'Listening to One of Two Synchronous Messages,' *Journal of Experimental Psychology* 44: 51-5
- Broadbent, D. E. (1958) *Perception and Communication*, London: Pergamon Press
- Burge, T. (1991) 'Vision and Intentional Content,' in E. Lepore and R. van Gulick (eds.) *John Searle and His Critics*, Oxford University Press
- Burge, T. (2007) 'Psychology Supports Independence of Phenomenal Consciousness,' *Behavioral and Brain Sciences* 30: 500-501
- Burge, T. (2010) *Origins of Objectivity*, Oxford University Press
- Campbell, J. (1997) 'Sense, Reference and Selective Attention,' *Proceedings of Aristotelian Society* 71: 79-98
- Campbell, J. (2002) *Reference and Consciousness*, Oxford University Press
- Campbell, J. (2004) 'Reference as Attention,' *Philosophical Studies* 120: 265-76
- Campbell, J. (2011) 'Visual Attention and the Epistemic Role of Consciousness,' in C. Mole, D. Smithies, and W. Wu (eds.) *Attention: Philosophical and Psychological Essays*, Oxford University Press
- Carrasco, M., et. al. (2004) 'Attention Alters Appearance,' *Nature Neuroscience* 7(3): 308-13
- Cavanagh, P. (2001) 'Seeing the Forest but not the Trees,' *Natural Neuroscience* 4: 673-4
- Coltheart, M. (1980) 'Iconic Memory and Visible Persistence,' *Perception and Psychophysics* 27(3): 183-228
- deVries, W. and Triplett, T. (2000) *Knowledge, Mind, and the Given: Reading Wilfrid Sellars's 'Empiricism and the Philosophy of Mind'*, Hackett Publishing Company, Inc
- Dancy, J. (1988) *Perceptual Knowledge*, Oxford University Press
- Davidson, D. (1984) *Inquiries into Truth and Interpretation*, Clarendon Press
- Dennett, D. (1989) *The Intentional Stance*, MIT Press
- Deutsch, J. A. and Deutsch, D. (1963) 'Attention: Some Theoretical Considerations,' *Psychological Review* 70: 80-90

- Di Lollo, V. (1980) 'Temporal Integration in Visual Memory,' *Journal of Experimental Psychology: General* 109: 75-97
- Dretske, F. (1981) *Knowledge and the Flow of information*, MIT Press
- Dretske, F. (2006) 'Perception without Awareness,' in T. S. Gendler and J. Hawthorne (eds.) *Perceptual Experience*, Oxford University Press
- Dretske, F. (2010) 'What We See: The Texture of Conscious Experience,' in B. Nanay (ed.), *Perceiving the World*, Oxford University Press
- Dummett, M. (1975) 'Wang's Paradox,' *Synthese* 30: 301-24
- Evans, G. (1982) *The Varieties of Reference*, Oxford University Press
- Fine, K. (1975) 'Vagueness, Truth and Logic,' *Synthese* 54: 235-59
- Fitts, P. M. and Posner, M. I. (1973) *Human Performance*, London: Prentice Hall
- Goodman, N. (1968) *Language of Art: An Approach to a Theory of Symbols*, Hackett Publishing Co, Inc
- Greene, E. (2007) 'Information Persistence in the Integration of Partial Cues for Object Recognition,' *Perception and Psychophysics* 69(5): 772-84
- Haber, R. and Standing, L. (1970) 'Direct Measures of Short-Term Visual Storage,' *Quarterly Journal of Experimental Psychology* 21: 216-29
- Haugeland, J. (1981) 'Analog and Analog,' *Philosophical Topics* 12: 213-22
- Hellie, B. (2005) 'Noise and Perceptual Indiscriminability,' *Mind* 455: 481-508
- Huang, L. and Pashler, H. (2007) 'A Boolean Map Theory of Visual Attention,' *Psychological Review* 114: 599-631
- Irvine, E. (2013) *Consciousness as a Scientific Concept: A Philosophy of Science Perspective*, Springer
- Kosslyn, S. (1981) 'The Medium and the Message in Mental Imagery: A Theory,' *Psychological Review* 88(1): 46-66
- Kouider, S., Dehaene, S., Jobert, A., and Le Bihan, D. (2007) 'Cerebral Bases of Subliminal and Supraliminal Priming During Reading,' *Cerebral Cortex* 17(9): 2019-29
- Kouider, S., de Gardelle, V., Sackur, J., Dupoux, E. (2010) 'How Rich is Consciousness? The Partial Awareness Hypothesis,' *Trends in Cognitive Sciences* 14: 301-7
- Landman, R., Spekreijse, H., and Lamme, V. A. F. (2003) 'Large Capacity Storage of Integrated Objects before Change Blindness,' *Vision Research* 43(2): 149-64

- Lavie, N. (1995) 'Perceptual Load as a Necessary Condition for Selective Attention,' *Journal of Experimental Psychology* 21(3): 451-68
- Lewis, D. (1971) 'Analog and Digital,' *Nous* 5: 321-7
- Lewis, D. (1986) *On the Plurality of Worlds*, Oxford University Press
- Long, G. (1980) 'Iconic Memory: A Review and Critique of the Study of Short-Term Visual Storage,' *Psychological Bulletin* 88(3): 785-820
- McDowell, J. (1990) 'Peacocke and Evans on Demonstrative Content,' *Mind* 394: 255-66
- McDowell, J. (1996) *Mind and World, New Edition*, Harvard University Press
- Maley, C. J. (2011) 'Analog and Digital, Continuous and Discrete,' *Philosophical Studies* 155: 117-31
- Martin, M. G. F. (1997) 'The Shallows of the Mind,' *Proceedings of Aristotelian Society* 71: 80-98
- Mole, C. (2011) *Attention is Cognitive Unison: An Essay in Philosophical Psychology*, Oxford University Press
- Nagel, T. (1974) 'What is it like to be a Bat?' *Philosophical Review* 83(4): 435-50
- Neisser, U. (1967) *Cognitive Psychology*, Englewood cliffs: Prentice-Hall
- Overgaard, M., Rote, J., Mouridsen, K. and Ramsøy, T. Z. (2006) 'Is Conscious Perception Gradual or Dichotomous? A Comparison of Report Methodologies During a Visual Task,' *Consciousness and Cognition* 15: 700-8
- Pashler, H. (1997) *The Psychology of Attention*, MIT Press
- Peacocke, C. (1986) 'Analogue Content,' *Proceedings of Aristotelian Society* LX: 1-17
- Peacocke, C. (1989) 'Perceptual Content,' in J. Almog, J. Perry, and H. Wettstein (eds.) *Themes from Kaplan*, Oxford University Press
- Peacocke, C. (1991) 'Demonstrative Content: A Reply to John McDowell,' *Mind* 397: 123-33
- Peacocke, C. (1992) *A Study of Concept*, MIT Press
- Peacocke, C. (1998) 'Nonconceptual Content Defended,' *Philosophy and Phenomenological Research* LVIII: 381-8
- Peacocke, C. (2010) *Truly Understood*, Oxford University Press
- Perkins, R. and Bayne, T. (2013) 'Representationalism and the Problem of Vagueness,' *Philosophical Studies* 162(1): 71-86

- Phillips, I. (2011) 'Perception and Iconic Memory,' *Mind and Language* 26(4): 381-411
- Phillips, I. (in preparation) 'Consciousness and Its Limits.'
- Prinz, J. (2010) 'When is Perception Conscious?' in Nanay, B. (ed.) *Perceiving the World*, Oxford University Press
- Pylyshyn, Z. (1981) 'The Imagery Debate: Analogue Media versus Tacit Knowledge,' *Psychological Review* 88(1): 16-45
- Rilling, M. and McDiarmid, C. (1965) 'Signal Detection in Fixed Ratio Schedules,' *Science* 148: 526-7
- Roederer, J, G. (2003) 'On the Concept of Information and Its Role in Nature,' *Entropy* 5(1): 3-33
- Rosenthal, D. (2008) 'Consciousness and Its Function,' *Neuropsychologia* 46: 829-40
- Russell, B. (1917) 'On the Notion of Cause,' in his *Mysticism and Logic*, George Allen and Unwin, London
- Schellenberg, S. (2011) 'Perceptual Content Defended,' *Nous* 45(4): 714-50
- Sekuler, R., Sekuler. A. B., and Lau, R. (1997) 'Sound Alters Visual Motion Perception,' *Nature* 385: 308
- Sellars, W. (1956) 'Empiricism and the Philosophy of Mind,' in Herbert Feigl and Michael Scriven (eds.), *Minnesota Studies in the Philosophy of Science, vol. 1*, University of Minnesota Press, Minneapolis
- Sergent, C. and Dehaene, S. (2004) 'Is Consciousness a Gradual Phenomenon? Evidence for an All-or-none Bifurcation During the Attentional Blink,' *Psychological Science* 15: 720-8
- Siegel, S. (2010) *The Contents of Visual Experience*, Oxford University Press
- Siewert, C. (1998) *The Significance of Consciousness*, Princeton University Press
- Siewert, C. (2012) On the Phenomenology of Introspection, in D. Smithies and D. Stoljar (eds.) *Introspection and Consciousness*, Oxford University Press
- Shannon, C. E. and Weaver, W. (1949) *The Mathematical Theory of Communication*, University of Illinois Press
- Smithies, D. (2011) 'Attention is Rational-Access Consciousness,' in Mole, C., Smithies, D., and Wu, W. (eds.) *Attention: Philosophical and Psychological Essays*, Oxford University Press

- Snowdon, P. (2010) 'How to Think about Phenomenal Self-Knowledge,' in A. Coliva (ed.) *Self and Self-Knowledge*, Oxford University Press
- Soto, D., Mäntylä, T., and Silvanto, J. (2011) 'Working Memory without Consciousness,' *Current Biology* 21(22): 912-3
- Sperling, G. (1960) 'The Information Available in Brief Visual Presentations,' *Psychological Monographs: General and Applied* 74(11): 1-29
- Stalnaker, R. (1984) *Inquiry*, Cambridge University Press
- Stazicker, J. (2011) 'Attention, Visual Consciousness and Indeterminacy,' *Mind and Language* 26(2): 156-84
- Styles, E. (2006) *The Psychology of Attention*, 2nd Edition, Psychology Press
- Treisman, A. (1960) 'Contextual Cues in Selective Listening,' *Quarterly Journal of Experimental Psychology* 12: 242-8
- Treisman, A. (1988) 'Features and Objects,' *Quarterly Journal of Experimental Psychology* 40A: 201-37
- Turing, A. M. (1950) 'Computing Machinery and Intelligence,' *Mind* 59: 433-60
- Tye, M. (1995) *Ten Problems of Consciousness*, Cambridge University Press
- Tye, M. (2000) *Consciousness, Color, and Content*, Cambridge University Press
- Tye, M. (2006) 'Nonconceptual Content, Richness, and Fineness of Grain' in T. S. Gendler and J. Hawthorne (eds.) *Perceptual Experience*, Oxford University Press
- Tye, M. (2010) 'Attention, Seeing, and Change Blindness,' in E. Sosa and E. Villanueva (eds.), *Philosophical Issues: Philosophy of Mind, Vol. 20*, Wiley-Blackwell, 410-37
- Van Fraassen, B. (1966) 'Singular Terms, Truth-Value Gaps, and Free Logic,' *Journal of Philosophy* 63(17): 481-95
- Watanabe, K. and Shimojo, S. (2001) 'When Sounds Affect Vision: Effects of Auditory Grouping on Visual Motion Perception,' *Psychological Science* 12: 109-16
- Watzl, S. (2011) 'Attention as Structuring of the Stream of Consciousness,' in Mole, C., Smithies, D., and Wu, W. (eds.) *Attention: Philosophical and Psychological Essays*, Oxford University Press
- Weisstein, N. and Wong, E. (1986) 'Figure-Ground Organization and the Spatial and Temporal Response of the Visual System,' in E. C. Schwab and H.

- C. Nussbaum (eds.) *Pattern Recognition by Humans and Machines, Volume 2, Visual Perception*, Academic Press
- Williamson, T. (1990/2013) *Identity and Discrimination, Reissued and Updated Edition*, Wiley-Blackwell
- Williamson, T. (1994) *Vagueness*, Routledge
- Williamson, T. (2000) *Knowledge and Its Limits*, Oxford University Press
- Xu, F. and Spelke, E. (2000) 'Large Number Discrimination in 6-Month-Old Infant,' *Cognition* 74: B1-11

The essay is a study of phenomenal specificity. By ‘phenomenal’ here we mean conscious awareness, which needs to be cashed out in detail throughout the study. Intuitively, one dimension of phenomenology is along with specificity. For example it seems appropriate to say that one’s conscious awareness in the middle of the visual field is in some sense more specific than the awareness in the periphery under normal circumstances. However, it is difficult to characterise the nature of phenomenal specificity in an accurate way. This essay seeks to do just that.

Tony H. Y. Cheng is a M.Phil. student of philosophy at University College London



UNIVERSITY COLLEGE LONDON

Department of Philosophy

London, U.K.

Design by Tony H. Y. Cheng

Cover Image: From ‘Rich Conscious Perception Outside Focal Attention,’ Ned Block,
2014

Back Image: Photo of the Author, at University of Reading, courtesy of Nat Hansen,
2013