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The structure of experience, the nature of the visual, and type 2 blindsight ☆

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ABSTRACT

Unlike those with type 1 blindsight, people who have type 2 blindsight have some sort of consciousness of the stimuli in their blind field. What is the nature of that consciousness? Is it visual experience? I address these questions by considering whether we can establish the existence of any structural—necessary—features of visual experience. I argue that it is very difficult to establish the existence of any such features. In particular, I investigate whether it is possible to visually, or more generally perceptually, experience form or movement at a distance from our body, without experiencing colour. The traditional answer, advocated by Aristotle, and some other philosophers, up to and including the present day, is that it is not and hence colour is a structural feature of visual experience. I argue that there is no good reason to think that this is impossible, and provide evidence from four cases—sensory substitution, achomatopsia, phantom contours and amodal completion—in favour of the idea that it is possible. If it is possible then one important reason for rejecting the idea that people with type 2 blindsight do not have visual experiences is undermined. I suggest further experiments that could be done to help settle the matter.

0. Introduction

Unlike those with type 1 blindsight, people who have type 2 blindsight have some sort of consciousness of the stimuli in their blind field. What is the nature of that consciousness? More specifically, do those people have a visual experience of a stimulus or of some of its features, or do they lack such a visual experience, and have some other type of conscious state, such as a conscious feeling or thought? I address this question by considering whether we can establish the existence of any structural features of visual experience. Structural features of experience are necessary features of experience. I will argue that it is very difficult to establish the existence of any such features. In particular, I investigate whether it is possible to visually, or more generally perceptually, experience form or movement at a distance from our body, without experiencing some colour (chromatic or achromatic colour). The traditional answer, advocated by Aristotle, and some other philosophers, up to and including the present day, is that it is not. I argue that there is no good reason to think that this is impossible, and the evidence, although not conclusive, suggests that it is possible. If this is possible then one important reason for rejecting the idea that people with type 2 blindsight do not have visual experiences is undermined.

This result is important for if it can be established that those who have type 2 blindsight are having visual experiences then we have reason to think that area V1 of the visual cortex is not required for visual consciousness. This is because such

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people suffer lesions to V1.[1] (See Zeki and ffytche (1998), Stoerig and Barth (2001), and ffytche and Zeki (2011).) Moreover, there is some evidence to suggest that in fact type 1 blindsight does not exist at all, and that all cases of blindsight are really of type 2 (Overgaard, Fehl, Mouridsen, Bergholt, & Cleeremans, 2008). If that is right then one main source of evidence for thinking that there can be unconscious perception is removed.

In section one, I explicate what structural features of experience are. In section two, I outline the nature of type 1 and type 2 blindsight. In particular, I outline the debate about the nature of the conscious state in those said to have type 2 blindsight. In section three, I discuss the difference between different kinds of mental states and argue that those with type 2 blindsight either have visual experiences or conscious thoughts. We should eschew the idea that their awareness or consciousness is a matter of them having feelings. In section four, I examine the evidence about the nature of the awareness or consciousness had in type 2 blindsight. I show that one reason given by Overgaard et al. (2008) and Overgaard and Grünbaum (2011) for thinking that those with type 2 blindsight have visual experiences is not a good one. I then go on to explicate two arguments that Brogaard (2011, 2012) has put forward in favour of thinking that the sort of consciousness in type 2 blindsight is conscious thought. I show that one of these arguments is not suitably backed up by the empirical evidence. So the weight of her position rests on the other argument. That argument relies on the premise that visual experiences have a certain structural feature: they must all be experiences of colour. In section five, I explore whether one should believe that visual experiences must have that feature and conclude that there is no good reason to think that. Indeed, the evidence tells in favour, although not conclusively, of the claim that they do not. That evidence also points towards an account of what the visual experiences of those with type 2 blindsight might be like that has not yet been considered. I show that visual experiences can be like that. I therefore conclude that there are no good arguments for the conclusion that the type of consciousness enjoyed by people with type 2 blindsight cannot be visual experience. And I suggest further experiments that could be done to test whether they do have such experiences.

1. Structural features of perceptual experience

What are structural features of perceptual experience? Structural features of experience are invariant features of experience. On a weak understanding, they are simply invariant features of human perceptual experience that exist as a matter of nomological necessity given the kind of human brain that we have. Thus, the perceptual experiences of creatures that have other types of brain need not exhibit these invariant features, nor need the perceptual experiences of subjects with human brains in possible worlds with a physics unlike our own. On a strong understanding, structural features of perceptual experience are metaphysically or conceptually necessary invariant features of experience *tout court*. Such features would be true of any creature with any type of brain in every possible world. Of course, there will be accounts of structural features of experience of strengths intermediate to the strong and the weak kinds just outlined: metaphysically necessary features true of all subjects with humans brains, and nomologically necessary features true of all creatures no matter what kind of brain they have. However, I set these aside in this paper.

Here are some examples of propositions that some people have claimed specify structural features of perceptual experience. I offer these up only as candidates for propositions that specify structural features. I do not show that they really are ones.[2] I begin with an example that many hold to be true:

(i) Necessarily, perceptual experiences are conscious.

This is plausibly proposition that specifies a structural feature of perceptual experience—and a structural feature of perceptual experience in the strong sense. Many philosophers hold this to be true *a priori*.

Many candidate structural features of perceptual experience will be features concerning what is represented in perceptual experience. Some may be pertain to all experiences. For example this proposition specifies an alleged such feature:

(ii) Necessarily, perceptual experiences represent space and time.

The representation of space and time is, somewhat plausibly, a weak structural feature of perceptual experience. However, some structural features may pertain only to experiences in a certain modality. Consider these modality specific claims:

(iii) Necessarily, auditory experiences represent sound.
(iv) Necessarily, visual experiences represent colour.[3]

Again these seem, to some degree, to be plausible truths about structural features of experience. For example, Aristotle in *De Anima* held that each of the sensory modalities had a proper sensible, that is, an object or property that could only be

[1] Although people with type 2 blindsight don't suffer complete loss of V1, the area of V1 loss corresponds to the area of their visual field in which they have type 2 blindsight. Thus, if it can be shown that they have experience in this area of the visual field but lack corresponding areas of V1 then there is reason to believe that V1 is not necessary for visual consciousness.

[2] An interesting discussion defending the idea that there are different structural features of vision and touch is found in Soteriou (2011).

[3] By "colour" I mean not only chromatic colour but also black, white and grey. I use "colour" this way through out this essay.

represented by that sensory modality and that was always represented by that sensory modality: sound in the case of hearing, colour in the case of vision, pressure and temperature in the case of touch, smells in the case of olfaction, and tastes in the case of taste. (Aristotle considered there to be only these five senses.) The proper sensibles contrast with common sensibles such as shape, which can be represented in more than one modality: vision and touch. For Aristotle the proper sensibles were the defining features of the sensory modalities. The proper sensibles were that which made each sensory modality the sensory modality it was. They individuated the senses.[4] I will come back to discuss claim (iv) later in this paper.

Some claims about candidate structural features of perceptual experience concern what is not represented in experience:

(v) Necessarily, perceptual experiences do not represent the future.

And some such claims are restricted to experiences in specific sensory modalities:

(vi) Necessarily, visual experience does not represent sound.
(vii) Necessarily, visual experience does not represent tastes.

Some claims about candidate structural features may be ones that pertain to combinations of representational features:

(viii) Necessarily, auditory experiences represent some volume when they represent some pitch.
(ix) Necessarily, tactile experiences represent only one object as being at any location.
(x) Necessarily, visual experiences represent only one colour to be on a surface at any given time.
(xi) Necessarily, experiences of red are more similar to experiences of orange than they are to experiences of green.[5]

As I said above, but let me emphasise, I am not claiming that these are propositions that specific structural features of perceptual experience, only that they are the sorts of claim worthy of consideration for specifying structural features. Indeed claims about structural features of perceptual experience are very often particularly difficult to establish. Let me provide you with one example: whether it is possible for perceptual experiences to represent reddish-green.

Wittgenstein discussed the questions of whether there could be a reddish-green colour, whether a reddish-green colour could be perceived, or whether the concept of reddish-green even makes sense. Lugg (2010) makes a careful summary of his remarks suggesting that while the popular interpretation of Wittgenstein has been that at least at some points in his career he claimed that there could be no perceptual experiences of reddish-green, Wittgenstein "is genuinely puzzled, that he is pulled in both directions and cannot commit himself either way." (Lugg, 2010: 172). Nonetheless, perhaps inspired by Wittgenstein, some philosophers, for example Brenner (1987), have held that there could be no experiences as of a reddish-green.

However, this claim looks to be disproved by recent results from Crane and Piantanida (1983) and Billock and Tsou (2004). They assert that they have created experiences of reddish-green in the laboratory. There are interesting questions about whether there is clear proof for the existence of such experiences. (See, for example, Lugg (2010) and Nida-Rümelin and Suarez (2009).) However, if such experiences have been created then a claim that some took to specify a strong structural feature of perceptual experience has been disproved.[6]

Faced with such a case, one might wonder how one could ever defend any claim about the structure of experience—either strong or weak. One might think that the primary evidence that would support a claim about the structural features of experience would come from the sorts of experience that one has had and the sorts of experience that one has not. However, that evidence concerns what is the case. How does one get from claims about what is the case to modal claims about what could be the case—as claims about the structural features of experience are?

One might think that one can extend one's knowledge from claims about what one has experienced to claims about what one could experience by drawing on one's sensory imagination. For example, no one has ever seen the national animal of Scotland, the unicorn, for such creatures have never existed. Suppose someone had never visually experienced a unicorn because they had never seen one and had not hallucinated one, or had a visual experience as of one while watching a film or looking at a hologram or the like. Nonetheless, such a person could imagine what it would be like to visually experience a unicorn—as many people have done. One imagines what it would be like to experience a unicorn by conjoining in the imagination, in the appropriate way, what one knows of what it is like to experience a white horse and what it is like to experience a white horn. Based on this, it seems right to say that one can know that it would be possible to have an experience as of a unicorn. Such a combinatorial process allows one to consider numerous experiences that one has not had and whether they are possible. Despite this, however, one might think that the imagination is limited in an important respect. How could one come to have knowledge of whether it is possible to experience things that are not simple conjunctions of what one has experienced?

[4] For more on this topic see Macpherson (2011a).

[5] Philosophers who have held that there are necessary resemblance relations between the colours include Armstrong (1987: 44) and Hardin (1993: 66).

[6] Brenner would disagree. He thinks that in the situation in which people came to agree that in the Crane and Piantanida experiment they had experiences of reddish-green, our language would have changed so as to make room for the expression "reddish-green", when previously it did not include it because there was "no right or wrong, true or false, employment" of the term prior to people reporting such experiences (1987: 209). He says that compared to the old language, in use before the experiment, the new language "would express different concepts rather than opposing truth-claims, different forms of description rather than contrary descriptions." (1987: 210) I disagree. "Reddish" and "greenish" have perfectly good meanings in our language and I can't see why "reddish-green" doesn't inherit it's meaning from the meaning of each of those two words (both prior to and after Crane and Piantanida's experiment was carried out).

Recall that Hume (1739–40/1975: 6) said that it is possible that one may be able to visually imagine what it would be like to experience that which one has not perceived (and, although Hume did not, we can add here that which one has not had an experience as of) and which is not something that can be visually imagined by a simple conjoining of things that one has seen. I will call such things "novel qualities". For example, as Hume famously argued, if one had experienced all the shades of colour except one particular shade of blue, one might come to be able to imagine what it would be like to experience that shade if one was presented with all the other shades of blue laid out in order of resemblance. However, cases where one can imagine novel qualities are few and far between—as Hume himself noted. He states of the missing shade of blue, "the instance is so particular and singular, that it is scarce worth our observing" (1739–40/1975: 6). Hume goes on to note that, "We cannot form to ourselves a just idea of the taste of a pine apple [sic], without having actually tasted it" (1739–40/1975: 6) He thus foreshadows Jackson (1982) who claims that if one had only had an experience as of black and white and shades of grey among the colours, one could not come to know what it was like to have an experience as of red.[7] Of course, if someone has only had experiences as of black, white and grey then they cannot legitimately conclude that experiences as of other colours, such as red are impossible.

A notable feature of the experiments in which it was claimed that people came to have experiences as of reddish-green is that before having the experience as of reddish-green, subjects said that they could not imagine what it would be like to have such an experience, but afterwards they could imagine it. I think that, in general, people who have not had an experience as of reddish-green, and who have just had typical human experience, cannot imagine reddish-green. I certainly cannot. Given this, the inability to imagine reddish-green before having the experience would explain why people might have thought that such experiences were impossible. However, as in the case of red discussed by Jackson in the previous paragraph, we cannot conclude just from the fact that one has not had a certain type of experience, and the fact that one cannot imagine what such an experience might be like, that such an experience is not possible.

In arguing about whether a certain sort of experience is possible, there may be further considerations that one can bring into try to establish the matter. If one were trying to establish that experiences as of reddish-green were impossible then one might adduce arguments concerning the opponency of the visual system. According to colour opponent theory, information from the eye is processed in the brain in an antagonistic manner. There are three opponent channels: the red versus green, the blue versus yellow, and light versus dark. The brain cannot signal the presence of red at a location at the same time as it signals that there is green at a location. (It could however, indicate that both red and blue were present at the same locations, in which case, it would be signalling that purple was present.) If all brain processing were subject to these opponent channels, then one might argue that subjects whose brains were so constrained could never experience reddish-green. (And if one made a case that their brains were so constrained as a matter of nomological necessity then, in doing so, one would be putting forward an argument that not being able to be as of reddish-green is a weak structural feature of experience.) However, Crane and Piantanida (1983) speculate that the "filling in" process that produces the experience allows the visual cortex to signal for the presence of red and green at the same location at the same time by allowing it to signal the presence of colours unconstrained from bottom-up opponent channels.

What the considerations above show is that in every case where we wish to identify structural features of experience, we will have to look closely at what evidence is available. Evidence from our imagination can play a role in establishing what is a structural feature; however, the inability to imagine an experience should not be taken as conclusive evidence that such an experience is impossible. Furthermore, other evidence should be sought and weighed as best we can.

Considering what the structural features of visual experience are will be important in thinking about the nature of the experiences had by those people who have type 2 blindsight. I will consider whether we can visually experience something as being at a distance from our body without at the same time having an experience as of its colour. Can we determine whether or not this is true? Knowing the answer could help settle a debate about the nature of type 2 blindsight.

In the next section, I discuss the nature of type 1 and type 2 blindsight, and outline the question of what is the nature of the conscious state that is had in type 2 blindsight. I will distinguish between different candidates for what that conscious state is: a feeling, a perceptual experience, or a thought.

[7] David Lewis (1988) suggests that one could come to know what it is like to have an experience as of red even if one has only seen or had experiences as of black, white and grey, or come to know what it is like to have an experiences as of vegemite if one has not perceived or had an experience as of vegemite. His explanation would equally apply to Hume's example of the taste of pineapple. He suggests that if one's brain was put into the state that it would be in right after one has had an experience as of red, vegemite, or pineapple for the first time, then one would know what it was like to have those experiences even though one had not had them. I think that either such people would know what it was like to see red, taste vegemite or pineapple or they would be in a position to know what it was like. However, in the former case, I think that they would only know because they would be sensorily imagining or sensorily quasi-remembering what it was like. (Quasi-remembering is seeming to remember without actually remembering because one's apparent memory is false.) And it would be in virtue of having that imaginative or quasi-memory experience that they would know. In the latter case, the people would not be sensorily imagining or sensorily quasi-remembering what it was like. However, they would be in a position to be able to do in the future. If they did so, then I would say that at that future point they would come to know what it was like. They would not before. The crucial point is that one can resist the thought that one can come to know what an experience is like just by being put in a brain state. One can insist that that brain state will only confer knowledge of what it is like by in some way determining that one has some experience or other with the relevant phenomenal character or it will put one in a position to know in the future what it is like by causing an appropriate brain state that confers knowledge in virtue of it determining that one has some experience or other with the relevant phenomenal character.

2. Type 1 and type 2 blindsight

According to the traditional conception of blindsight (Weiskrantz, 1986), a subject has blindsight when he or she does not acknowledge any awareness or consciousness in a portion of his or her visual field (the blind field), yet nonetheless, some visual functioning remains intact. Physiologically, blindsight occurs when there is damage to the part of the primary visual cortex (V1) that corresponds to the blind field. Blindsight subjects report that they are totally blind in that area of their visual field. Yet, it can be determined that some information from the blind field does affect subjects' behaviour. In particular, in a forced choice paradigm, subjects are able to guess with a high degree of accuracy about some features of a stimulus presented in their blind field. For example, Weiskrantz (1997: 23) says that people with blindsight "have been reported who are able, in their blind hemifields, to detect the presence of stimuli, to locate them in space, to discriminate direction of movement, to discriminate orientation of lines, to be able to judge whether stimuli in the blind field match or mismatch those in the intact hemifield, and to discriminate between different wavelengths of light, that is, to tell colours apart." People with blindsight are initially unaware that they have blindsight and are not simply blind. It comes as a surprise to them that their guesses are accurate, although they can come to know that their guessing is accurate when experimenters tell them so.

It should be noted that subjects cannot generate accurate guesses themselves. One reason is that in the experimental setting in which they display their guessing ability, the experimenter provides two options that they have to choose between, one of which is accurate. And the experimenter uses his or her knowledge of how the world is in the subjects' blind field to ensure that there is one accurate option. However, subjects on their own cannot reliably generate two options one of which corresponds to the way the world is.

It has been found that some patients who have been classified as having blindsight in fact report some limited consciousness in what is typically called their "blind field".[8] In response to such cases, Weiskrantz (1998) introduced a distinction between type 1 and type 2 blindsight. Type 1 blindsight is that which conforms to the traditional definition above in that no consciousness corresponding to the stimuli in the blind field is reported. Type 2 blindsight is defined as occurring when some limited consciousness of the stimulus in the blind field exists. However, how to characterise this consciousness is a tricky business.

In attempting to characterise it, some people have focused on the fact that sometimes what is reported in type 2 blindsight is a mere conscious "feeling" or conscious "knowing" of the nature of the stimulus—but a conscious state that does not amount to a visual experience. In his definition of type 2 blindsight, Weizkrantz states that the nature of the consciousness is "acknowledged experience of events in the blind field in the absence of acknowledged 'seeing'" (1998: xi). So, Weizkrantz, and others who have endorsed the existence of type 2 blindsight, have claimed that the consciousness that is present in these cases does not consist of a visual experience of the stimulus or some of its features.

Many of the cases of type 2 blindsight that have been discussed in the literature are type 2 blindsight with respect to movement. Subjects with type 2 blindsight may have type 1 or type 2 blidsight or be completely blind with respect to other features of objects in their blind fields. In contrast to Weizkrantz, other researchers (Zeki and ffytche (1998), Stoerig and Barth (2001), and ffytche and Zeki (2011)) have claimed that the form of consciousness that type 2 blindsight subjects have is visual experience. That is, they claim that these subjects have visual experiences of movement (at least sometimes—typically the more high-contrast the stimulus and the faster it is moving it is the more likely subjects are to report awareness). These researchers often classify the subjects as having "Riddoch syndrome". Riddoch (1917) examined men injured in war who reported that they were blind in one half of their visual fields, except for the fact that they reported seeing movement in them.[9] These researchers noted that type 2 blindsight patients with respect to movement seem to be just like those patients Riddoch studied. Because they classify the awareness as visual experience they tend not to classify the subjects as having "type 2 blindsight". Why is this? The answer is that if the subjects are having a visual experience, then it is tempting to say that they are just seeing and hence do not have blindsight.

If type 2 subjects have visual experiences, should we classify them as just seeing and not having type 2 blindsight? The answer to that question is complicated because a subject who has type 2 blindsight with respect to some feature or features of an object is typically blind and/or has type 1 blindsight with respect to the other features of objects in the blind field. To illustrate, suppose we placed a red X-shaped object on the left of a subject's blind field and then moved it to the right of that field. A subject might report having some form of consciousness of the left to right movement but deny having any consciousness of anything else. Moreover, at the same time, the subject could, in a forced choice paradigm, be able to guess reliably that the shape was that of an X and not be able to guess reliably that it was red. In such a case, the subject would have type 2 blindsight for the movement of the object, type 1 blindsight for the shape of the object, and simply be blind with respect to the colour of the object.

With these considerations in mind, what is the answer to the question of whether, if type 2 blindsight involves having a visual experience, the subject would just be seeing and hence would not have blindsight? The answer is that, at least with respect to the feature in question that they are visually experiencing, the subject would be seeing that feature. Given that, it does seem appropriate to question whether it is right to say that those in whom the consciousness amounts to visual

[8] I will continue to call the area in question the "blind field" although, of course, if some consciousness is reported in it, then it may not be totally blind. An overview of the evidence is given in ffytche and Zeki (2011) and Overgaard (2012).

[9] At least in many instances this was the form that the reports took. In other cases it was not so clear and, as per Weizkrantz's suggestion above, knowledge of movement was attributed to the subject. See Zeki and ffytche (1998: 26).

experience have a form of blindsight with respect to the feature they experience. For they just seem to be seeing it. Nonetheless, I will stick to calling people who report any form of consciousness of limited features people with type 2 blindsight—with respect those features that they so report—and I will also speak of their "blind fields". One reason is that "Riddoch syndrome" is only a term that applies to those who reported blindness except for movement. It is useful to have a term that does not just pertain to cases of reported awareness of movement. Another reason is that it is very useful to have a term that applies to those who report some consciousness of just one, or a limited number, of features in the presence of either blindness or type 1 blindsight for other features, where the terms leaves open what the nature that awareness is. For it is useful to ask of such people whether we can determine whether their awareness is a feeling, a visual experience, or knowledge, or judgment of a feature of an object.

To summarise: psychologists have identified a group of subjects who report being, for the most part, blind in a portion of their visual fields. Those subjects do, however, report some form of consciousness of movement—and only movement—in that field. Some researchers think that the awareness is a feeling, or knowing, or judging. Other researchers think that the awareness is a visual experience—a minimal or highly degraded one that represents a limited number of features of a stimulus. In either case, I will classify these subjects as having type 2 blindsight and investigate what we can determine about the nature of their conscious mental state. Do they have visual experiences or do they have some other type of conscious mental state? I will set aside the worry that, if it turns out that these subjects have visual experiences, then the term "type 2 blindsight" may not turn out to be the most appropriate nomenclature for their condition for it would be appropriate to say that the subjects see the feature that they claim awareness of.

I said earlier in this section that many cases of type 2 blindsight involved subjects reporting consciousness of movement. A case not involving movement is reported by Overgaard et al. (2008) who investigated a subject GR. When subject to standard blindsight testing, GR displays behaviour which would lead one to classify her as having type 1 blindsight. For example, when asked whether she can detect stimuli in a certain portion of her visual field, given only the options of answering "yes" or "no", she reports that she does not. When a letter is presented in that portion of her visual field and she is asked to guess in a forced choice paradigm whether the letter is "A", "B" or "C", she performs better than chance. However, Overgaard et al. tested GR further. They asked her to rate her experience on a four point scale:

> (CI) 'clear image', (ACI) 'almost clear image' (meaning 'I think I know what was shown'), (WG) 'weak glimpse' (meaning 'something was there but I had no idea what it was'), and (NS) 'not seen' (2008: 1).

When GR was tested in the damaged portion of her visual field on thirty-three occasions, seven were reported as "clear image", eleven as "almost clear image", twelve as "weak glimpse", and three as "not seen". Moreover, there was a positive relationship between the accuracy of the "guess" about what the stimulus was and the clarity of the experience. In fact, there was the same relationship between accuracy and clarity in her blind field as there was in her intact field. These results indicate that GR does have some consciousness of the stimulus. It therefore seems right to classify her not as having type 1 blindsight, but type 2.[10]

As in the case of those who have type 2 blindsight with respect to movement, researchers have different views about what kind of consciousness to ascribe to GR. Overgaard et al. (2008) and Overgaard and Grünbaum (2011) argue that GR has a visual experience, while Brogaard (2011, 2012) argues that GR only has a conscious thought that is about the nature of the stimulus.

In this section, I have explained the difference between type 1 and type 2 blindsight and briefly outlined the different answers in the debate about the nature of the awareness had in type 2 blindsight. Some say that it is a feeling or thought. Others say that it is a visual experience—albeit a degraded one. In the next section, I give an account of what these different types of mental state are. I argue that the consciousness of those with type 2 blindsight should not be described as a feeling. The only serious options for what the nature of their awareness or consciousness is, is a visual experience or a conscious thought.

3. Types of mental state

What is the difference between feelings, thoughts, and visual experiences?

Thoughts are a type of propositional attitude. Other types of propositional attitudes include beliefs and desires. When one has a propositional attitType 2 blindsight ude one takes an attitude, such as holding it to be true in the case of belief, or wanting it to be true in the case of desire, to some proposition. For example, if one believes that Scotland should be independent, then one takes the attitude of holding it to be true towards the proposition that Scotland should be an independent country. If one desires that Scotland be an independent country, then one takes the attitude of wanting it to be true that Scotland is an independent country. When one has a thought about something one can be merely entertaining a proposition (considering whether a proposition is true), or one can be endorsing a proposition. Propositional attitudes are representational states. They are about something, and what they are about is specified by the proposition to which one takes an attitude. In the

[10] Overgaard (2012) suggests that other blindsight subjects should be tested in this manner. Although he does not quite go so far as to suggest it, a radical thought that his work might give rise to is that perhaps all people with blindsight really have type 2 blindsight, rather than type 1. Perhaps this has not been realised because testing to date for awareness or consciousness of the stimulus has not been subtle enough. This is a controversial suggestion, but one that would be worth investigating.

case of the thought that Scotland should be an independent country, the proposition, that Scotland should be an independent country, specifies that which is represented.

Thoughts, unlike beliefs and desires, are always occurrent states rather than dispositional states. Thoughts can be conscious or unconscious. There is an interesting question as to whether conscious thoughts have phenomenal character.[11] One view is that in and of themselves they do not, but that they are usually or always accompanied by states that do. In particular, they might be accompanied by visual imagery. In the case of thinking that Scotland should be an independent country, perhaps one has visual imagery of mountains and lochs, the Saltire, and the face of William Wallace. The thought might also be accompanied by auditory imagery. For example, one might hear the words "Scotland should be an independent country", or "Freedom", in one's own inner voice. On this view, no imagery in particular is essential to thinking the thought (although one might think that some imagery or other usually or always does so). Someone else might have visual imagery of Glasgow and of the faces of Robert the Bruce and the Black Douglas. And they might not have auditory imagery of the words "Scotland should be an independent country", but the French words "Ecosse devrait être un pays indépendant". Another view, however, is that thoughts have their own proprietary phenomenal character associated with grasping the meaning of the proposition.

Contrasting with the propositional attitudes are feelings, also known as "sensations", such as pains, itches and tickles. These states clearly have phenomenal character, and indeed plausibly, theses states are individuated by their phenomenal character: what makes a pain a pain is the way that it feels, and what makes an itch an itch is the distinctive itchy feel that such states have. Thus feelings and sensations have been thought of as essentially conscious states.

Traditionally feelings have been conceived of in philosophy as states that do not represent. Why is that? Thomas Reid (1785/2002: I. i. 36) said that sensation, "hath no object distinct from the act itself". The idea is that if I have a sensation of pain, there is no object—a pain—that I am sensing. My sensation is not 'of' any object, therefore it is not representational. More recently, the traditional view of feelings as non-representational has been questioned. It is agreed that feeling states, such as pains and itches, do not represent objects called feelings—objects that are pains or itches. Rather, it is claimed that feelings represent different states of the body. (See Armstrong (1962, 1968) and Pitcher (1970, 1971) and, more recently, Tye (2006a, 2006b).) For example, a throbbing pain in one's big toe might represent that there is an increase and decrease in the volume of damaged and inflamed tissues in one's toe. A sharp stabbing pain in the chest might represent that something pointed is entering and tearing asunder the flesh in one's upper torso. A feeling of hunger might represent one's stomach contractions and low blood glucose.

Perceptual experiences have been traditionally thought of as hybrid states: being somewhat like the propositional attitudes and somewhat like feelings or sensations. Like the propositional attitudes, perceptual experiences seem to represent and be about things in the world. My present visual experience of a teapot seems to represent a silver object with a round body with various protrusions, corresponding to the handle, spout and knob of the lid. My auditory experience of the whistle of the kettle, represents a high-pitched loud note.[12] At the same time, like feelings and sensations, perceptual experiences are essentially conscious states that have phenomenal character that differentiates one perceptual experience from another.

Given the characterisation of these three types of states that are the candidates for what kind of state a person with type 2 blindsight is in, it is clear that feelings are just not good candidates. The reason is that the people with type 2 blindsight say that they have a feeling about some state of affairs in the world. For example, they say that they have a feeling that something in front of them is moving. Such a state would be a state that represented something in the world exterior to their body. As feelings are either not representational at all, or they represent something happening to the body, they are not the type of state that those with type 2 blindsight are reporting.

We can explain, nonetheless, why it is the case that people with type 2 blindsight use the word "feeling" to describe their mental state. Sometimes in everyday language we use this word to indicate that we are not quite sure what kind of mental state we are in. One might say, "I have a feeling that our guests are arriving on Tuesday", when one wants to report that one has some evidence to this effect but one isn't quite sure where from. One might not know whether one remembers this, or whether one is guessing at this based on what one was previously told about the travel plans (say that some other destination would be reached by Monday), or whether one has worked it out based on the time one knows it takes to travel between certain places, or what have you. However, although this everyday usage is perfectly acceptable, that does not mean that we should take such talk to imply that subjects mean that the person has feelings in the sense outlined above. Therefore, I will limit my investigation of the mental states of people with type 2 blindsight to the investigation of whether such people are having visual experiences or whether they are having thoughts.

How does one determine whether someone is having a conscious thought about something or whether he or she is having a perceptual experience? That is a very tricky question indeed. Perceptual experience seems to inform us of the way the

[11] Sometimes the words "phenomenal character" and "qualia" are used interchangeably. However, sometimes "phenomenal character" is taken to be a philosophically neutral term referring to the subjective qualities of experience, while "qualia" is taken to be a philosophically loaded term implying that the qualities in question are as a Cartesian would take them to be: private, ineffable, one we are infallible about, and nonphysical. I use "phenomenal character" throughout this essay to remain philosophically neutral about the nature of those qualities. Others that I quote will sometimes use "qualia". I take them to mean "phenomenal character" in all instances.

[12] Some philosophers, direct realists, have lately claimed that our experiences do not represent the world. Rather, our experience consists in having the world presented to us immediately with no need for intermediate representations. I set this view aside because even if it were true, a crucial difference between feelings and perceptual experiences would exist. Those experiences would either represent or present the world, while feelings either do not represent or present anything, or represent or present only the body.

world is now. (At least it seems that way to us: even if we are looking at a distant star and our experience is actually informing us of an event that took place many years ago.) However, we may not believe that the world is as our experience presents it to be. For example, one might think that one is suffering from an illusion or a hallucination and so not be inclined to believe what one's experience seems to tell one. To this extent, experience is different from belief. However, we are considering how to distinguish experience from thought. One could certainly entertain the thought that this is how the world seems, yet be inclined to desist believing that is how it is because one has reason to not to fully trust the thought in question. So we have no reason yet to distinguish experience and thought.

One way in which thought and perceptual experience are different is with respect to their phenomenal character. Perceptual experience typically seems to be about the about the world in front of one at a distance from one's body. It typically tells one, among other things, about colours, shapes, sizes, positions, movements, and so on.[13] Clearly thought can be about this too—although it can be about many more things than it seems visual experience, and perceptual experience more generally, can be about. However, what it is like to visually experience colour or shape or size or movement is different to what it is like to think about these things, if indeed there is anything it is like to think about them. But what one can say about this difference is unclear, not least because there is such discord in thinking about the phenomenal character of thought—as I outlined earlier in this section—and not least because it is hard to describe the phenomenal character of visual experience other than to say what it is an experience as of. Nonetheless, although describing differences in phenomenal character is difficult, and although there are different views about the phenomenal character of thought, I take it that visual experience has a distinctive phenomenal character either because thought has a different one or lacks one. Thus, in ascribing a visual experience to a person, one is ascribing to them a distinctive sort of phenomenal character. I discuss this topic in greater length in the section below.

There may be other differences between thought and perceptual experience. For example, some people think that thought is conceptual while visual experience is, or is in part, or can be nonconceptual. However, I leave this topic aside for I don't believe that even if there is this difference, it will help to settle the question of which state is had by people with type 2 blindsight.

How one could test for perceptual experience rather than thought—as opposed to merely knowing what the difference is between them—is a difficult matter too. One might think that one could simply scan the brain and see if the visual areas of the brain are active, However, one can only know what parts of the brain correspond to visual experience by correlating reports of visual experience, and its lack, with brain activity. When we are dealing with blindsight, an important and pertinent issue is what areas of the brain should be taken to give rise to visual experience. Stoerig and Barth (2001) and ffytche and Zeki (2011) use their conclusion that people with type 2 blindsight are having visual experiences to deny the claim that has often been made that activation in the V1 areas of the visual cortex is necessary for visual experience. Therefore, we cannot rely on evidence about what areas of the brain are active as a guide to what kind of mental state is being had by the subject.

In this section, I have argued that people with type 2 blindsight are either having conscious thoughts about the stimuli in their blind fields or they are having visual experiences. They are not having feelings. Perceptual experiences have different phenomenal character to conscious thoughts, if indeed the latter have phenomenal character. In the next section, I go on to examine the evidence and the arguments that have been put forward by both sides concerning whether the type 2 blindsight subject is consciously thinking about or visually experiencing the world.

4. The evidence and extant arguments about type 2 blindsight

Are type 2 blindsight subjects having degraded visual experiences of some sort or are they having conscious thoughts? Let's look at the evidence from the subjective reports of various subjects.

Zeki and ffytche (1998) examined Riddoch's (1917) accounts of the subjective reports of his patients. In all these cases, the patients "were able to detect the presence of motion within their scotomatous fields, without being able to characterize the other attributes of the stimulus" (1998: 26). Here are the reports:

> Patient 1: "The 'moving things' have no distinct shape, and the nearest approach to colour that can be attributed to them is a shadowy grey".
> Patient 2: 'The 'moving something' had neither form nor colour. It gave him the impression of a shadow".
> Patient 3: "could detect the movement of feet in the street '. . . though they had no shape"'
> Patient 4: ". . . declared he could distinguish no object . . . but he knew that something had moved through his blind field"
> Patient 5: 'They [the moving objects] don't appear to have any colour or shape. They look like shadows. Sometimes I can tell if the moving things are white." (1998: 26)

In each of these cases it is clear that movement is reported. It is important to distinguish the question of whether subjects could identify the colour of the stimulus from the question of whether they had an experience of some colour or other, and this is not clearly enough done in the reports of the subjects' experience. Subjects clearly could not detect the colour of the stimulus. (Although one subject says that they could tell if something was white, this is an anomalous report.) However, the

[13] Exactly what the contents of experience can be is an interesting question that is discussed at length in Hawley and Macpherson (2011).

subjects report that their experiences are like looking at shadows. And one alludes to the colour grey. One view is that subjects visually experience dark grey indeterminate shapes moving on a slightly lighter grey or slightly darker grey background. Another view is that subjects have visual experiences without experiencing any colour properties. A third view is that the subjects did not have visual experiences, they only had thoughts. The best candidate for the thought that they had is that it was a thought that something moved, perhaps more specifically the thought that something moved in a certain direction, with a certain speed. Which of these views is true is unclear.

ffytche and Zeki (2011) found two subjects, GN and FB , who were very similar to the patients of Riddoch (1917) in terms of their reports and responses. In addition to reporting consciousness of the stimulus, GN and FB "could prepare drawings of what they had perceived in their blind field, which compare favourably with the drawings of the same stimuli when presented to their intact fields" (2001: 254). ffytche and Zeki go on to say "their drawings and ... descriptions left us in no doubt that the experiences they had were visual in nature and amounted to what might be called 'visual qualia'" (2011: 254). However, their conclusion goes rather beyond the available evidence because one could draw a picture of how one thought the world was, rather than how one experienced the world to be.

Another person with type 2 blindsight for movement who has been studied in modern times is GY. Zeki and ffytche (1998: 29) report that in 1993, GY described his visual experiences as dark and shadowy. However, later, in 1994, he changed his mind. He now said that he had a "'feeling' of something happening in his blind field and, given the right conditions, that he is absolutely sure of the occurrence" (1998: 29). When Zeki and ffytche pointed out to him that his description had changed he said that he had previously "been using language that he thought a normally sighted person would understand" (1998: 29–30). Two years later, in 1996, he said his experience was "as that of 'a black shadow moving on a black background', adding that 'shadow is the nearest I can get to putting it into words so that people can understand'. (1998: 30).

When Zeki and ffytche tested GY's blindsight for movement, they asked him to indicate the direction of movement of a stimulus and his level of awareness on a four point scale, similar to the way in which Overgaard et al. (2008) tested GR (described in section two above). Like Overgaard et al., Zeki and ffytche found that GY reported consciousness of movement more frequently when he was given the four-point scale to use, compared to the condition in which he had to indicate with a "yes" or "no" whether he was conscious. Moreover, his ability to correctly identify the direction of the movement correlated positively with his reports of awareness.[14] The evidence from these varying reports of GY is not enough to settle the question of the nature of his conscious state one way or the other.

GY has been investigated by other experimenters concerning the nature of his consciousness. Unfortunately, the evidence points in opposite directions as to the nature of his consciousness. Stoerig and Barth (2001) report that GY denies seeing. And they cite previous descriptions that GY has given of his experience: "He is aware of 'something moving' but it appears as 'black on black,' like 'a mouse under a blanket' (personal communication), or 'similar to that of a normally sighted man who, with his eyes shut against sunlight, can perceive the direction of motion of a hand waved in front of him' (Beckers & Zeki, 1995, p. 56)." (2001: 582). They also report that "in other experiments he has, for instance, stressed an absence of color sensation" (2001: 582). Yet, they found that despite denying seeing, when a moving texture of low contrast was presented to GY in his intact visual field, he accepted that it created the same conscious state in him as a high-contrast bar moving in his blind field. Furthermore, they found an even better match when they used an apparent motion stimulus.[15] Stoerig and Barth conclude that as a match with a visual experience was made, GY's awareness or consciousness in his blind field is just the same as the visual experience he has in his intact field. This is a minimal or degraded experience: one that they describe as having a "reduced phenomenal content" (2001: 584).

In contrast, Persaud and Lau (2008) gave GY several definitions of "qualia", a term that I take them to hold is synonymous with "phenomenal character".[16] They then questioned GY as to whether he experienced any qualia in his blind field. His answer was that he denied "having visual qualia of stationary stimuli in his affected field. He was adamant that he never has visual qualia in his affected field in everyday life." (2008: 1048). And asked whether he had qualia of moving stimuli in the affected field he replied "No, never" (2008: 1047). So the evidence about GY's conscious state flip-flops over time, and is dependent on how he is tested and what he is asked.

Finally, the last piece of evidence comes from the Overgaard et al. (2008) study of GR, outlined in section two above. Recall that previous to their investigations, GR had been classified as having type 1 blindsight. When asked whether or not she can detect stimuli in her blind field and given only the options of answering "yes" or "no", she reports that she does not. Overgaard et al. then asked GR to rate her experience in the blind field on a four point scale, "(CI) 'clear image', (ACI) 'almost clear image' (meaning 'I think I know what was shown'), (WG) 'weak glimpse' (meaning 'something was there but I had no idea what it was'), and (NS) 'not seen'" (2008: 1). Out of thirty-three occasions, GR reported seven times a "clear image", eleven times an "almost clear image", twelve times a "weak glimpse", and three times "not seen". In light of this evidence it seems that we should classify GR as having type 2 blindsight, but what we should conclude about her conscious state is that it is not clear what its nature is.

[14] Although reports of experience correlates with performance in some cases, there are examples where this is not so, for example, in the original blindsight patient DB, as discussed in Weiskrantz (1986).

[15] Note that when GY accepted that a low-contrast moving texture resembled his blind field experience this was only after extensive testing with many, many other low-contrast textures. In addition, there was no attempt to test whether this resemblance was reliable.

[16] See footnote.[8]

In summary, the reports of subjects' experience and the experiments performed to try to get clearer about the nature of the mental states of those with type 2 blindsight are inconclusive. The evidence is mixed and points in different directions. Those who believe that people with type 2 blindsight are having visual experience point to the evidence which suggests that they are having visual experience; those who deny this draw attention to the evidence which suggests otherwise. Both sides rightly warn of taking introspective reports at face value. I will now look at different arguments that have been made by researchers in favour of one or other of the positions that people with type 2 blindsight are either having (possibly minimal or degraded) visual experiences or that they are having conscious thoughts. These arguments go beyond the citation of the introspective reports in the different conditions mentioned above.

One argument in favour of the idea that people with type 2 blindsight are having a visual experience (and hence visual phenomenal character or qualia) is inspired by the causal origin of the reported awareness. For example, Overgaard and Grünbaum suggest that there is reason to hold that if a subject reports a conscious mental state and that it is caused by visual stimuli then the state should count as a visual experience. They state, "a visual process is one in which a subject at some level reacts to something visual. From this ... it should follow that if there is any kind of preserved conscious experience in blindsight subjects caused by visual stimuli ... those experiences should be conceived of as visual" (2011: 1858).[17]

This argument is spurious. There are many counterexamples which spring from noting that the nature of the stimulus, the nature of the sensory organ, and the kind of early perceptual processing that takes place does not fix the nature of the conscious state that is subsequently had by a subject. First, there are examples in which the nature of the stimulus, the nature of the sensory organ, and the kind of early perceptual processing that takes place may all be of one modality, while the subsequent experience is in a different modality. For example, in synaesthesia, people have an experience in one modality, say a visual experience of redness, caused by a visual stimulus affecting their eyes, which leads to visual processing. However, at the same time another experience in a different modality is also caused to occur in them, such as an auditory experience of sound. What this shows us is that the criteria for which type of experience is being had is not the same as which type of stimulus, sensory organ, or perceptual processing is taking place. Although often the modality of the experience will match the modality of the stimulus, organ and processing, it need not. These can come apart in interesting ways.[18]

Second, there are examples in which the nature of an experience had in one modality is affected by processing in another modality—typically in cases labelled as "cross-modal illusions".[19] For example, in the McGurk effect when an auditory stimulus—a /ba/ sound—is heard alone, it is typically reported accurately as a /ba/ sound. But when it is heard whilst looking at lips making movements that would produce a /ga/ sound, then people typically report hearing a /da/ sound instead (McGurk & MacDonald, 1976). Their auditory experience of the /da/ sound has as a causal origin both auditory and visual stimuli, sensory organs, and processing. Another example is the sound-induced illusory flash experience. When one flash is presented together with two tones, subjects frequently reported that they saw two flashes (Shams, Kamitani, & Shimojo, 2000). In this example, at least one of the visual experiences of the flash had both auditory and visual stimuli, sensory organs, and processing. There are many other such cross-modal illusions.

Third, there are clear cases in which stimuli, sensory organ activation, and processing all belonging to the same modality cause conscious states other than perceptual experiences. For example, on seeing something or hearing something, or both, one might become incredibly sad, or happy, or angry. Emotions are not perceptual experiences but they are frequently caused by perceptual stimuli, sensory organ activation, and processing. Thoughts beliefs, desires, and volitions can be caused by perceptual stimuli, sensory organ activation, and processing. Likewise, if there are any examples of type 1 blindsight, or any form of unconscious perception such as that apparently caused by masking, then there will be examples of conscious thoughts involved in guessing that are not perceptual experiences.

In short, one cannot argue that the modality of the stimulus, the sensory organ, and the existence of perceptual processing, entails that a subsequent conscious state is a perceptual experience of one modality or another. Nor can one even determine that it will be a perceptual experience, rather than some other kind of mental state. Thus, the argument just considered for the conclusion that the conscious mental state of those with type 2 blindsight is not sound.

In contrast to Overgaard and Grünbaum (2011), Brogaard (2011, 2012) argues that, based on the evidence to date, there is reason to believe that those with type 2 blindsight are having thoughts about the world and not visual experiences. (She in fact thinks that whether or not in the end she is right about this is an open question that could be settled in the future by some further detailed study of subjects who are more thoroughly instructed with respect to, and asked about their own, phenomenal character. However, from now on, I will present her arguments in favour of the view that those with type 2 blindsight lack visual experience and have merely conscious thoughts without this qualification.) Brogaard holds that people with type 2 blindsight have thoughts about the stimulus in response to their guessing about the way the world is. She says,

[17] Their comments come in debate with Brogaard after they claim that she has not shown that the phenomenology of type 2 blindsight is clearly cognitive. Zeki and ffychte engage in a similar line of reasoning. They state, "Such experience as these subjects have, whether described as seeing or feeling, is triggered by a visual stimulus and is therefore a visual experience." However, they admit that they would have no way to show that such "visual experiences" have visual phenomenal character—and hence using my conception of visual experience they would not have shown that there was a visual experience present. It is worth noting that, when discussing GN and FB who they explicitly liken to GY, ffytche and Zeki changed their mind from the earlier paper about what can be established and now state "These descriptions left us in no doubt that the experiences they had were visual in nature and amounted to what might be called 'visual qualia'" (2011: 254).

[18] See Macpherson (2011b).

[19] I say that they are labeled "cross-modal illusions" because whether they are all illusions or some should be classified as hallucinations in open to debate. For example, in the sound-flash "illusion" it is arguable whether one of the flashes is a hallucination, rather than an illusion.

"Individuals with blindsight can make correct guesses. Guesses come with a phenomenology, just not the kind normal individuals have when a visual stimulus is presented to them... it has not been shown that the phenomenal consciousness blindsight involves is distinctly visual. I suspect that it is not" (2011: 459). Brogaard's argument for this is that the proximal cause of a visual experience is the visual stimulus, the stimulation of the eyes, and visual processing, but this is not the proximal cause of the conscious state of the type 2 blindsight subject. The cause of the conscious state of those with type 2 blindsight includes the visual stimulus, the stimulation of the eyes, and visual processing, but it has other causes besides. The conscious state of those with type 2 blindsight has guessing as a proximal cause. Moreover, the proximal cause of the guessing is not the same as that of visual experience either. She states, "different mechanisms no doubt underlie guesses and seeings. So guesses and seeings have different proximate causes" (2012: 596).[20]

Do we have evidence that people with type 2 blindsight only have the conscious state they report when they make guesses, which is what Brogaard's account requires? One might think that there is such evidence. After all, in some cases outlined above, it is only when subjects were asked to guess what was in front of them that they reported that they had some conscious state (and even then only when they were asked whether they had some conscious state using the four-point scale, rather than when asked simply to state whether or not they were conscious of the stimulus). However, it is unclear whether Riddochs' patients only responded that they were aware of movement when asked to guess or whether they spontaneously reported it. And the same seems true of GY—although admittedly his case history is complex. However, even if guessing was not required, that does not stop the subjects in question simply having spontaneous thoughts—as opposed to visual experiences— about their situation. Thus, although Brogaard's account requires guessing, a very similar one that requires only thoughts does not require the evidence about guessing to turn out one way rather than another. Moreover, even if it turned out that subjects did only have the conscious mental state when they guessed, this does not guarantee that their conscious mental state is a though. It could be that they have conscious visual experiences and that guessing is required in order for the people to have those conscious visual experiences. For example, it could be that in order to have a visual experience, people with type 2 blindsight have to focus their attention in a certain way, and that this is facilitated by guessing. This is just one suggestion; there may be others that could explain why the subjects only had a visual experience when they guessed. In short, I don't see that we have good evidence that guessing is the proximal stimulus of the conscious state that people with type 2 blindsight report, and even if it were, that is not enough to show that those people are not having visual experiences.

A second argument is used by Brogaard to suggest that those with type 2 blindsight are having conscious thoughts rather than having visual experiences. Speaking of those who report awareness of movement, she states, "even if a stimulus perhaps does give rise to an experience with a "clear" phenomenology, this does not provide any evidence of visual awareness of color, shape, or location" (2011: 458), and "blindsighters lack the sort of distinctly visual awareness that includes a purely qualitative color phenomenology" (2011: 459). Those attributes, she implies, are necessary for having a visual experience, and because subjects lack them, they are not having visual experience and are only having conscious thoughts about the stimuli.[21]

As stated briefly above, it is not clear whether those subjects who are aware of movement are aware of colour. One problem is that those who are reporting on the experiences sometimes say that the subjects were not aware of the colour properties of the stimulus. However, while it is clear that subjects can't tell what colour things are in the world, it is not so obvious whether they experience the world as being some colour or other—even if it does not have that colour. On the one hand, it seems as if the conscious awareness reported is sometimes of a dark shadow moving against a darker background. This would be an experience of:

- colour: dark grey and black
- form: an indeterminate shadowy shape, and
- movement: from one direction to another.

We can certainly have visual experiences like those. If we get people reporting awareness of those features, then a crucial premise of Brogaard's argument is false and she lacks a good reason to deny visual experience to people who have such awareness.[22]

However, on the other hand, there is reason to think that the experience is even more minimal—at least in some subjects. This would be an experience of:

[20] Sometimes Brigaard speaks as if the conscious state is a guessing, which is a matter of having a certain thought. At other times she speaks as if the conscious state is a thought had in response to guessing. The latter view is I think the best way to understand her, and I adopt it in the main text. Nothing much turns on which view Brogaard intends.

[21] "Colour" here means not only chromatic colour but also black, white and grey. C.f. footnote.[1]

[22] There is a report in Perenin and Jeannerod (1978: 4) of blindsighted subjects having "the feeling that a quite bright light had been turned on in the impaired part of their visual field, and was spreading from there into the normal field. But none of the subjects could "see" the form or size of the target, nor have any conscious idea about its location, which they only "guessed" when required to respond in the tests." And in Barbur et al. (1980: 921) of patient G in whom "[m]ore intense stimulation of the 'blind' hemifield gives a sensation of a well-localized bright flash. It is unclear from the reports whether these are reports of type 2 blindsight "feelings", or not. If they were then, like the cases where dark shadows are reported, they would show that one of Brogaard's premises was false, at least regarding some type 2 blindsight patients. As stated in the main text, the argumentation of Brogaard and my response in this chapter does not therefore apply to such cases—only to cases in which feelings of colour are not reported.

- movement: from one direction to another
- form: an experience of an area lacking clear boundaries
- but no colour.

Why would one think this? GY and the patients of Riddoch say that their experience is somewhat like looking at a shadow. But they don't straightforwardly say that it is like looking at a dark shadow moving on a dark background. It is as if subjects are gesturing to something that is not quite like a shadow. When it was pointed out to GY that he had changed his description from having a visual experience of a shadow (1980) to just having a feeling (1994), he said he was using language that he thought the sighted would understand by mentioning shadows. In 1996 "he described his experience as that of 'a black shadow moving on a black background', adding that 'shadow is the nearest I can get to putting it into words so that people can understand" (Zeki & ffytche, 1998: 30). This provides reason to think that some subjects are having very minimal visual experiences: movement without colour and rather indeterminate form.

As we have seen, it is very hard to determine what the conscious mental states of people with type 2 blindsight are like. But let us suppose, as Brogaard does—and as we have seen there is some, although not conclusive, evidence to suppose—that those with type 2 blindsight (or at least some people with type 2 blindsight) do have awareness of movement and indeterminate form without colour. Is Brogaard right to think that this is good reason to think that those with this condition lack visual experiences and hence lack visual phenomenology? I will investigate this claim by considering whether there could be other minimal visual experiences of movement or form without colour. In other words, what I want to do is to investigate whether the following claim about an alleged structural feature of experience, mentioned in section one above, is true:

(iv) Necessarily, visual experiences represent colour.

Brogaard's argument requires that it is. But as we have seen it is exceptionally difficult to establish the existence of any structural features of experience. What evidence is there that this claim about an alleged structural feature of experience is true?

As I explained in section one, Aristotle said that sight can be defined as the perception of colour. (See Sorabji (1971) for a clear commentary on this point focusing on Aristotle's *De Anima*, Book II, chapters 4 and 6. Sorabji claims that for Aristotle, this claim is not put forward as a truth that holds in all possible worlds, but that people may consider that it does.) Sorabji goes on to say that if one holds this view one should go on to say that there can be no visual experience without experience of colour. Size, shape, and movement are visually experienced in virtue of experiencing coloured things. Other philosophers have echoed this thought. Pete Mandik, for example, considers the question, "Can there be a visual experience devoid of both color phenomenology and black-and-white phenomenology?" (2014: 225) and answers "While I've not conducted anything remotely resembling a formal survey, I'm pretty confident that most philosophers of mind will answer 'no'" (2014: 228).[23]

John Hyman, who cites both Aristotle and James Clerk Maxwell as inspiration, says:

> colours, like smells and tastes, are basic properties, relative to the sense with which we perceive them. In other words, whatever else we perceive by the sense of smell–for example, that a fruit is rotten or that a child is ill— we perceive by smelling smells; whatever else we perceive by taste we perceive by tasting tastes; and whatever else we perceive by sight, we perceive by seeing colors—including the achromatic colors, of course. For example, I cannot see the shape of a banana except by seeing its spatial boundaries, however fleeting and uncertain this experience may be, And I cannot see its spatial boundaries except by seeing the differences of color that make it visibly distinct from its surroundings. That is why, as James Clerk Maxwell pointed out, all vision is color vision (Hyman, 2006: 18).

But is it? Surprisingly little evidence is garnered by those who state that it is. Usually it is stated in the manner that Hyman and Brogaard state it: as a fact; and any backing is given by citing Aristotle, Maxwell and other luminaries in an argument from authority. I suspect that the alleged fact is taken to be obvious based on repeated introspections of only visual experiences that are of coloured things. However, as I argued in section one, this is *not* good evidence in support of their being such structural features of experience.

In the next section, I consider evidence that we might have against colour being a necessary feature of visual experience—that is against colour being a structural feature of visual experience. I will begin by considering the nature of sensory substitution. I will argue that there are two plausible interpretations of subjects with congential blindness using tactile visual sensory substitution. One interpretation is that they are not having any new perceptual experiences. The other is that they are having new visual experiences of distal form that are not experiences of colour. If the latter interpretation were true, it would show that colour is not a structural feature of visual experience. However, unfortunately, the interpretation that they are not having new visual experiences cannot be completely ruled out. I will then consider the cases of an achromatopsic who can experience distal form created by chromatic boundaries alone, phantom contours, and amodal completion. I argue that these provide evidence of visual experience of distal form and movement with no differences in colour, luminance or texture, but without the complete lack of these. Such experiences provide an alternative explanation of type 2 blindsight and their existence lends support to the idea that there could be visual experiences in the absence of experience of colour.

[23] Mandik (2014) himself argues "yes".

This evidence undermines Brogaard's second argument in favour of the conclusion that people with type 2 blindsight are not having visual experiences and it should be rejected.

5. Is Colour a Structural Feature of Visual Experience?

Do we have any evidence of the existence of visual experiences that lack colour? We do. Consider, first, sensory substitution in which one sense is used to try to replace another. In cases of sensory substitution attempts are made to deliver information to a subject via a sense that does not usually deliver that information. Consider a particular kind of sensory substitution: tactile-visual sensory substitution (TVSS).[24] A camera produces a black and white picture of the world. This image drives a series of pins arranged in a grid that correspond to the image. The grid is placed against an area of a subject's skin, such as the back or the stomach. The white areas of the image make the pins in the corresponding area of the grid push forward into and/or vibrate against the skin of the subject.

After a few hours of practice in which subjects were able to move the camera and receive feedback on what the camera was detecting—for example by the experimenter telling them and by the subject feeling what the camera was pointed at—subjects could recognise a range of common objects, point accurately to objects in space, and judge their distance and absolute size. After about thirty hours they could make complex pattern discriminations, recognise the faces of members of laboratory staff, and display a looming response when the camera lens was zoomed. Subjects' reports about their experience indicate that initially they are only aware of the tactile stimulus/tactile experience. Then, after practice, they report experiencing stable objects out in the world in front of them, not the tactile stimulus/experience (although they can pay attention to the tactile stimulation if they want and have the tactile experience). Thus, it is said that subjects report their experience in quasi-visual terms. (Bach-y-Rita, 1972, and Guarniero, 1974).

One question to ask about the nature of the subjects' mental lives after they have practiced using the device is whether they come to have a new sensory experience. When subjects report a quasi-visual experience are they reporting some new kind of experience—visual or tactile or otherwise—or are they merely reporting new (often accurate) judgments that they can now make about the world based on ordinary tactile experiences caused by the pins? This question is, noticeably, rather similar to the one that we are asking with respect to those people with type 2 blindsight: are subjects having a perceptual experience or are they just making judgments? I will briefly review the evidence in the case of sensory substitution.

A distinctive new quasi-visual experience is reported in many instances of sensory substitution.[25] Sensory substitution subjects more readily and consistently attest to a new experience than do people with type 2 blindsight. But how reliable are these reports? There is, unfortunately no objective test to see if someone is reporting accurately. Moreover, there is reason to think that reports about perceptual experience are sometimes not reliable. Consider the fact that there is disagreement even in ordinary cases of perception as to the nature of experience. For example, there have been centuries of philosophical disagreement about whether visual experience is two-dimensional or three-dimensional. Another contemporary example is the debate about how rich perceptual experience is—that is in how much detail does it represents the world.[26] Returning to the case of sensory substitution, the reports about experiences when using sensory substitution vary quite dramatically. Some people report vivid colour experiences, some report two-dimensional experience and some three-dimensional experience. Other people don't obviously report experience at all. On the one hand, this might lead one to doubt that we can trust such reports. However, on the other hand, the disagreement may occur because the experiences or conscious states had by different subjects are actually different. This would be explained by the fact that different sorts of subjects have trained on sensory substitution devices: sighted, late blind, early blind, and congenitally blind people. Moreover, subjects have undergone different training regimes, most noticeably in the length of the training and in the degree of immersion in everyday life of the use of the device. In addition, the motivation of subjects has been markedly different. Some subjects greatly enjoy the use of the device and want to use it. Others do not like it and do not want to use it. There may be other differences, perhaps innate ones, between different subjects. This might mean that some subjects have new perceptual experiences and some do not. In any case, it is clear that we can't take introspective reports as straightforward evidence in favour of the existence of new perceptual experiences.

As with the case of type 2 blindsight, one cannot look to brain imaging to establish whether people using TVSS are having new perceptual experiences. This is because we would have to be confident that any correlations that had been noted between brain activity and perceptual experience were reflective of all instances of perceptual experience. However, cases such as sensory substitution and type 2 blindsight precisely question that. In the case of sensory substitution in particular, there has been much speculation that practice with the substitution device might change the functional role of different parts of the brain, rendering prior apparent correlations otiose.

Besides subjective reports and brain imaging, other evidence has been cited in favour of the proposition that those using TVSS devices are having perceptual experience. One piece of evidence is the "looming" response displayed by subjects. When, unbeknown to subjects, experimenters zoomed the camera lens, subjects displayed the reflex action of backing away from something looming towards them. It is claimed that displaying this fast and automatic response attests to fast and automatic processing of the signal, which it is further claimed, is a sign of perceptual processing. Hence, it is argued, subjects

[24] Developed by Paul Bach-y-Rita (initially with Carter Collins). See Bach-y-Rita (1972). I focus on this case for ease of exposition, but the same points could be made about audio-visual sensory substitution, as exemplified by use of the vOICe, developed by Peter Meijer (1992).

[25] The most persuasive reports are given in Ward and Meijer (2010) with respect to audio-visual sensory substitution.

[26] See Noë (2002).

have a quasi-visual experience of something rushing towards them. This evidence certainly tells *prima facie* in favour of subjects having quasi-visual experiences; however, an opponent could argue that there could be fast and automatic inferences being made. Perhaps subjects can make fast and automatic inferences in light of their training that ordinary subjects cannot, and hence do not have quasi-visual experiences—they just have a thought that something is looming towards them. In addition, an opponent could point out that often recognition of objects by subjects using TVSS takes a relatively long time, effort, and attention. For example, a good object recognition performance might consist in a subject identifying an object in ten or more seconds. This is clearly unlike ordinary vision.

Another piece of evidence about whether subjects are having a visual experience that should be considered is the fact that blind people report forming new perceptual concepts such as parallax, shadows and interposition of objects after training with TVSS. Someone might try to argue that, as the blind didn't form these concepts before, it must be that they can do so now because they are having a new perceptual experience. However, one might think that the blind form these new concepts on account of inferences and judgments that they learn to make on the basis of tactile experiences. So while this evidence may also prima facie tell in favour of the idea that subjects are having quasi-visual experiences, it is not conclusive.

Finally, one can re-create persisting illusory visual effects using TVSS devices. One can create the Muller-Lyer illusion and the waterfall illusion in subjects using TVSS. Moreover, one can re-create these illusions when the subject knows the effect is illusory. This is often taken to be a key sign of perceptual experience—that it can persist in the face of conclusive counter-evidence—while belief should disappear. However, one can imagine a thought, judgment or belief that it seems as if the world is a certain way persisting in a subject when the subject knows that it is not that way. Thinking, judging or believing that things seem a certain way is compatible with knowledge that the world is not that way. Thus, one could think that subjects had such thoughts, judgments or beliefs, rather than quasi-visual experiences. So again, while suggestive, this evidence is inconclusive.

In summary, showing that subjects do have a new perceptual experience, rather than making fast automatic inferences is a real challenge. At the moment, we don't have a clear answer; however, in my opinion, the weight of the evidence points towards the conclusion that, at least in some cases, subjects have a new quasi-visual experience.

Although I have by no means shown it to be true, let us suppose that some subjects do have a new quasi-visual experience. It is worth doing this to reflect on what the nature of that experience would be. Do such experiences represent colour? It is tempting to think that colour—including black, white and grey—is not represented: for subjects only receive pressure stimuli, not chromatic or light stimuli. And even though the pressure stimuli are driven by a camera detecting light and producing black and white images, subjects need not know whether pressure corresponds to blackness or whether it corresponds to whiteness. So how would they, or their brains, know which colour to assign to an object? In particular, it is tempting to think that a congenitally blind person would not have experiences of colour. One might think that a non-congenitally blind person, or their brain, generates experiences of colour on account of previous chromatic experiences and knowledge of colour that they have. They might assign black or white colours to objects drawing on their colour knowledge or, simply, arbitrarily. Or they might assign chromatic colour. For example, if a subject saw a banana shape, their memory of previous yellow bananas might render the banana that they experience yellow. Ward and Meijer (2010) provide evidence that this does happen in some cases of sensory substitution. However, as congenitally blind people have never experienced colour, this method of colour entering quasi-visual experience cannot be what happens in them. Suppose therefore that congenitally blind people don't experience colour when using TVSS. Could they be having quasi-visual experiences—quasi-visual because they are experiences of form at a distance from the body—that don't involve experiencing colour? To assess this further let's think about bat echo-location.

One way that bats perceive without using their eyes is to send out a high frequency 'chirrup' and listen for the returning echo. Using this sense, bats can detect 3-D objects at a distance from their body. Doing this allows them to negotiate through their environment in the dark, quickly dodging obstacles such as tree trunks and branches, and skillfully catching moths. Clearly bats don't detect colour—for they are not making use of wavelengths of light—but they do detect form.

In virtue of what property do bats experience form? Perhaps bats experience distal form by experiencing sound-reflectance properties. After all, they are detecting form using sound-reflectance properties. If this were the case, then the experience of colour is not necessary in order to experience distal form.

But in experiencing distal form does one need to experience some other quality or other? Or could one have a "pure" experience of distal form alone—without experiencing any other quality? If one must experience distal form by experiencing some quality or other, what quality do congenitally blind people using the TVSS experience? One might suppose that they experience light reflectance in the form of luminance—after all it is light that is driving the camera's responses and hence ultimately the tactile stimulus on the congenitally blind person's skin. However, congenitally blind people using TVSS need not know what is driving the TVSS. Indeed, we could have built a device where the pins were not driven by camera, but by an echolocatory device. We could set things up so that a congenitally blind person would not be in a position to know whether it is a light sensitive camera that is gathering the relevant information about distal form or whether is an echo-location device that is doing so. Given this, there is reason to believe that they would not be experiencing distal form in virtue of experiencing light-reflectance or luminance.

Another suggestion is that congenitally blind TVSS users might be experiencing distal form in virtue of experiencing the pressure that they feel on their skin. One might think this because to some extent there is reason to say that the proximal stimulus acting on the subject is pressure. (I say, "to some extent" because one could make a case that if light is driving the camera then that is the proximal stimulus. Whether pressure or light should be held to be the proximal stimulus is

not obvious.) One reason to resist the thought that congenitally blind TVSS users are experiencing distal form in virtue of experiencing the pressure that they feel on their skin is because experienced users of TVSS say that they no longer have tactile experiences of pressure, or at least not ones that they notice. But they do have experiences—and experiences that they notice—of distal form.

To make things difficult for us, however, let us suppose, that the users are experiencing both pressure and distal form. (So let us suppose that when they report the absence of such experience they do so only because they are not attending to that experience, not because they are not having that experience.) In one sense, one could say that the users are experiencing distal form in virtue of experiencing pressure because if one took away the experience of the pressure (say by taking away the pressure on their skin) then the subjects would not have the experiences of distal form. However, this is true because the experiences of pressure cause the experiences of distal form. However, when asking whether TVSS users are experiencing distal form in virtue of experiencing the pressure I do not have a causal reading of "in virtue of" in mind here. When I say "in virtue of" I have a phenomenal relationship in mind. To illustrate what this is, consider the following example. Suppose that whenever one had an experience of a red circle, that experience caused one to have an experience of a blue square. In the phenomenal sense that I intend, one does not experience the rectangle in virtue of experiencing the redness—even though the experience of the redness is a cause of the experience of the rectangle. One experiences the rectangle, in the phenomenal sense, in virtue of experiencing the blueness. The form of the rectangle is experienced to be constituted by the blueness. This is the phenomenal sense of "in virtue of" that I have in mind. Here are some other examples of the in virtue of relation obtaining in the phenomenal sense: one auditorily experiences the pitch of a note in virtue of experiencing the volume of the note, one tactually experiences the roundness of a coin on the palm of one's hand in virtue of experiencing the pressure against of the coin against one's skin. In all these cases where one thing is experienced in virtue of (in the phenomenal sense) another, the two things are co-located: the blueness of the rectangle and the form of the rectangle, the pitch of the note and the volume of the note, the roundness of the coin and the pressure of the coin. The apparent co-location of qualities would seem to be required for one to be experienced in virtue of (in the phenomenological sense) another. Therefore, I don't think that it can be true that the congenitally blind users are experiencing distal form in virtue of experiencing pressure. The pressure that is felt is experienced as located on their skin and not at a location in front of the body where the distal objects with their forms are experienced to be. How could the form that is experienced to be at one location be experienced to be constituted by a quality experienced at another location? It could not.

If light-reflectance, luminance and pressure are not good candidates for what a congenitally blind person would experience when they experience distal form, and if there are no other good candidate qualities, this should lead us to think that experiences of distal form, without experience of any other quality, are possible. Of course we should remember that we have not ruled out completely the idea that the congenitally blind are not having perceptual experiences when using the TVSS. However, there is some reason to suppose that they are, and if we do suppose it then we have good reason to think that, as there is no good candidate for the property in virtue of which (in the phenomenal sense) they experience distal form, then there is no such property, and none is required. I will call such experiences experiences of "pure distal form". If there can be such perceptual experiences, then showing that people with type 2 blindsight lack experiences of colour does not entail that they lack perceptual experiences of distal form.

I turn now to consider three other cases: a special case of achromatopsia, the phantom contours created by Rogers-Ramachandran and Ramachandran (1998), and instances of amodal completion. The first of these cases is like the case of sensory substitution because there are two competing accounts of the nature of the conscious state that the subject is having, which we cannot settle definitively. The other two cases are, however, more clear-cut. All three of these cases differ from the case of sensory substitution because, unlike it, they do not provide examples of experiences of pure distal form. What they do provide is examples of experiences of distal form with no difference in colour—including black, white and greys—or texture. These are interesting cases that not only lend weight to the idea that there could be cases of perceptual experiences of pure distal form, they also provide us with another plausible account of the nature of the experiences of people with type 2 blindsight.

People with achromatopsia cannot see colour. This is tested for by the Farnsworth–Munsell 100-Hue Test, in which subjects are asked to place 100 patches of different hues in order (Farnsworth, 1943). Moreover achromatopsics can neither name nor match colours. They can detect luminance, and so can perceive many distal forms in virtue of differences in luminance. This condition comes in two forms: cerebral achromatopsia (in which an area of cortex that seems necessary for the experience of colour is lost) and retinal monochromatism (in which pigments (blue-cone monochromatism) or cell-classes (rod monochromatism) fail to be expressed in the retina). There is no wavelength specific input to the visual system in retinal monochromats. In contrast, cerebral achrmoatopsics have a normal set of wavelength selective inputs to the visual system.

A particular subject with cerebral achromatopsia, MS, has been studied by Kentridge, Heywood, and Cowey (2004). Despite being achromatopsic, he could detect isoluminant borders of different chromatic composition. When a shape was placed against an isoluminant background, which differed only in chromaticity, MS, could detect it. In other words, he could experience distal form (an edge) but not because he was detecting any changes or difference in luminance. These are very odd results. MS is sensitive to a pure chromatic difference despite, in all other respects, being colour blind. This raises interesting questions about MS's phenomenology when detecting such edges.

Kentridge et al. describe MS's behaviour and experience when looking at isoluminant edges thus:

> A world without background-invariant colour constancy for MS is not one of ever-changing unstable colour, it is one in which colour is absent and meaningless. This is not to say, however, that discrimination of local contrast is unconscious. For all but the most difficult discriminations MS either deliberated at length over his decisions or made them unhesitatingly. Only on very rare occasions did he need to be prompted to simply make a guess. The neural response to local chromatic contrast therefore produces a percept which is acted upon consciously (1994: 829).[27]

Suppose that we thought that because MS is achromatopsic he only sees black and white and shades of grey. This is a common view of what achromatopisic vision is like.[28] (However, this view of achromatopsic vision can be challenged as I will discuss in more detail below.) Because the border MS can detect is defined chromatically and not by luminance, we have reason to think that there is not a luminance difference—hence that MS will not experience it as defined by black, white or grey. But, at the same time, MS is an achromat and hence cannot order, discriminate, or name colours. So it is tempting to think that the border cannot be experienced by MS in virtue of his experiencing different chromatic colours. If MS doesn't experience the border in virtue of differences in shades of black, white or gray, and he doesn't experience chromatic colours, then one might think that MS must experience distal form without experiencing any difference in colour at all—chromatic or achromatic. In other words, one might postulate that MS experiences a uniform achromatic colour, yet some distal form within that achromatic field. If that is right, then the case of MS would provide us with an example of a visual experience of distal form with no difference in experience of (chromatic or achromatic) colour. Such an experience is not an experience of pure distal form, which is an experience of distal form without any experience of colour. It is an experience of distal form whilst having an entirely uniform experience of colour.[29]

If this is a correct description of the experience, then this is not exactly what we are looking for: an experience of distal form with no experience of colour. However, it would be something very close: an experience of distal form—an edge or boundary at a distance in front of one—with no difference in experienced colour or texture forming the boundary or existing across the experienced boundary. Nonetheless, their existence tells in favour of the idea that there could be experiences of pure distal form without colour for these experiences show that one needn't experience distal form in virtue (in the phenomenal sense) of experiencing colour boundaries. This is also a property of experiences of pure distal form.

Moreover, the existence of this kind of experience suggests a new account of the nature of the experience of those with type 2 blindsight for moving stimuli. Recall that GY reported that his experience was like "black on black" like "a mouse under a blanket" (Beckers & Zeki, 1995: 56, reported by Stoerig & Barth, 2001: 582). Perhaps GY experienced a uniformly black or uniformly dark grey achromatic surface and yet experienced a moving form or a moving edge across it, in a manner similar to the way in which we are supposing MS experiences distal form.

However, one might question this account of MS's experience. I said above that some people question the traditional view that achromats have experiences of the qualities of black, white and grey that humans with ordinary vision do. Akins (2014) argues that they do not. Similarly, when it comes to people with less severe forms of colour blindness—dichromats—the traditional view is that they lack experiences of red and green, and only experience the world in shades of yellow, blue and the greys. (See Broakes, 2010.) Broakes' own view is that they experience many more colours than yellows, blues and greys, and perhaps even experience all of the colours that normal observers do just not in as many sitations as those with normal colour vision. However, contrary to the traditional view and Broakes' view, others hold that dichromats experience none of the colours that those with normal colour vision experience. (See Byrne and Hilbert (2010) for arguments for two different versions of this view.) The reason that people have for holding that achromats and dichromats do not have any of the same sort of colour experiences compared to those with ordinary human colour vision is that the workings of their luminance and/or chromatic colour visual systems is so unlike that of those with ordinary human colour vision that it is reasonable to believe that they just have very different sorts of experience of the qualities of the surfaces of objects. Let us agree to call those qualities—chromatic or achromatic—"alien colours", as Byrne and Hilbert do.[30]

If it is right to think that those with different luminance and chromatic visual systems, compared to those of normal humans, experience alien colours (both chromatic and nonchromatic alien colours), then we should think that MS experiences alien colours. If that is right, then it opens up an account of his experience that is different to that considered above. Perhaps MS experiences patches of what those with normal human colour vision would experience as being different

[27] It is interesting to note that Kentridge et al. think that this study contributes to the debate about what neural activity is necessary for consciousness, as we have seen, in a different way, that the blindsight studies above do. Concerning the response of MS to the chromatic boundaries they state: "The most likely source of this neural response is in double-opponent cells in V1; certainly much of the later (so-called higher-order) parts of the visual system for colour are destroyed in MS. The implication is that activity in V1 in this experiment correlates with a conscious experience, a conclusion at odds with Crick and Koch (1998) hypothesis that only activity in areas making direct projections to frontal lobes may correlate with conscious experience. In MS the route is most likely to be indirect, for example from V1 to dorsal parietal cortex and only then onwards to prefrontal cortex" (2004: 829).

[28] See Akins (2014) who cites Nordby (1996), a vision scientist studying achromats who have only rod vision, and who himself has only rod vision (and thus is a retinal achromat). Nordby describes his visual phenomenology as consisting of black, white and shades of grey. As I go on to say, it is not clear whether this suggestion about the phenomenology of retinal achromats is correct. There is the further issue that what is true of the phenomenology of retinal achromats is not necessarily true of the phenomenology of cerebral achromats.

[29] It is worth noting that MS struggles to describe whether or in what respect the figure looks different from the ground (Kentridge, personal communication).

[30] In Macpherson (2003) I discuss colours that people do not normally see, experiences of which can be created in normal people with suitable stimuli and equipment in the psychology lab, "novel colours".

chromatic but isoluminant colours as having different alien colours. It would still be possible for MS to be unable to name, discriminate, or order what those with normal human vision would call different colours, in the way that normal humans do, because his visual system cannot in general pull apart luminance from chromaticity in the way that the visual systems of people with normal human vision can. If this interpretation of MS is correct then, in one sense, MS is experiencing distal form without colour—ordinary non-alien colour—but, in another sense, he is experiencing distal form with colour—alien colour. Whichever way one thinks it is best to describe the case, it would not be a case of experience of distal form without a difference in some quality or other.[31]

Deciding between these two hypothesis—that MS experiences boundaries but not in virtue of differences in colour or that MS experiences different in alien colours that define the boundaries—is very difficult. Recall that MS can accurately detect a shape on a background that has the same isoluminance, and that differs only chromatically. However, in addition, given three such shapes on such a background, one of which has a different colour but the same luminance from the others, he can tell the odd one out. One might think that this means that MS must experience a difference in the surface qualities of the different shapes, and therefore that the alien colour hypothesis must be true. However, there is an alternative explanation. It could be that the boundaries between the shapes and their backgrounds are more or less distinct in the different chromatic cases and so the boundaries appear different to MS in some respects, and that it is this boundary information, rather than difference in surface appearance, that MS is relying on to tell the odd one out.

A striking finding is that this ability to tell the chromatic odd one out is thwarted when the shapes are surrounded by a thick black border so that there is no direct contiguity between the colour of the shapes that have to be discriminated and their background (because the background and the shapes are each contiguous to the black border). This might tempt one into thinking that MS cannot be experiencing the shapes as having different alien colours. For, if he was, why would this difference in alien colour not persist in the face of the addition of the black boundaries, and allow him to do the task?

However, this fact is not decisive. When MS had to pick out the odd one out among three shapes against a uniform achromatic background, all of which had the same chromaticity (they were gray on a gray background), where one of the shapes varied in luminance from the other two shapes, he could, as one would expect, do so. However, when the shapes were surrounded by a black border he could not do the task. This is rather surprising. If one followed the logic of the reasoning in the above paragraph then one would be forced to say that MS doesn't experience differences in luminance either. If this is right, then perhaps MS only experiences edges and no surface qualities at all—neither chromatic or achromatic! Whether that tallies with his ability to discriminate luminance on other occasions is unclear. It certainly seems as if MS has difficulties comparing luminance and chromatic values between two areas that are not contiguous. This is compatible with him experiencing alien colours, yet only being able to compare and contrast them when particular boundary conditions obtain. Therefore, it is hard to know how to interpret the results of the experiments where there was the addition of the black border in the chromatic case.

Finally, Kentridge et al. (2004) point out that the Farnsworth–Munsell 100-Hue Test consists of colours embedded in, and surrounded by, black casings which resemble the black borders used in their experiments described above. Given that the above experiments show that the addition of black borders impedes discovery of the chromatic differences that MS can detect, further experimentation on MS would be desirable using methods that employ sorting tasks where the colours can be compared in conditions where their borders are contiguous. For all we know, MS might consistently sort the colours consistently and in line with some alien colour scheme in those conditions.

To summarise the discussion of MS, I have argued that there is one interpretation of MS according to which he has experiences of distal form without any difference in colour (chromatic, achromatic or alien), and another according to which he does not—he has experiences of form in virtue of alien colours. And the former interpretation has two subvarients. One of these is that MS can experience distal form while perceiving uniform achromatic colour. The other is that MS can experience distal form while perceive no chromatic or achromatic colour at all. Deciding between these accounts is in my opinion impossible at present. It would be interesting to try to probe the nature of MS's phenomenal character in more detail. One could ask him to compare a chromatic isoluminant boundary to an achromatic non-isoluminant one. One could also describe the two different accounts of his visual experience proposed here to him and ask him which, if any, he would be prepared to endorse. And then one could ask him to compare his experience of a chromatic isoluminant boundary to that of the "phantom contour" experiences and experiences of amodal complation described below. Nevertheless, at present, one cannot conclusively say that MS provides us with an example of experience of distal form perception without a difference in colour, but some plausible accounts of him do.

I turn now to consider two other cases: the phantom contours created by Rogers-Ramachandran and Ramachandran (1998), and instances of amodal completion. Unlike the cases of MS and sensory substitution where there were two different accounts of the nature of the conscious state being had which we could not decide between, these cases are ones where we can establish that subjects are having perceptual experiences and what their nature is. Neither case is a case of an experience of pure distal form. But they are examples of experiences of distal form with no difference in colour—including black, white and greys—or texture.

[31] Mandik (2014) argues against the proposition that necessarily, visual experiences represent colour. He considers MS and thinks that his vision is an example that shows it to be false, however he does not distinguish the two different interpretations of MS that I have done in the main text.

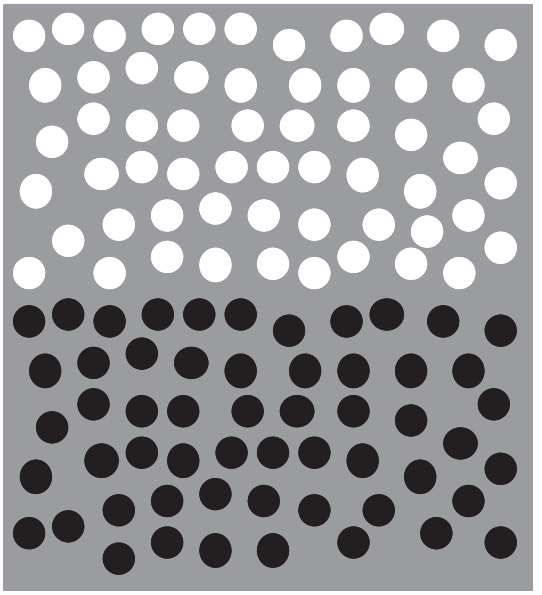

Fig. 1. The kind of stimulus used by Rogers-Ramachandran and Ramachandran (1998).

Rogers-Ramachandran and Ramachandran (1998) created a stimulus that consisted of a uniformly grey background. On one side of the background were white dots. On the other side were black dots, as shown in Fig. 1. The dots flickered in counterphase, so that when the white dots changed to black, simultaneously the black dots changed to white. When the frequency of the changes of the colour of the spots was low (less than 7 Hz), subjects could tell that the spots on one half of the stimulus were in counterphase with those on the other half. And, unsurprisingly, they could indicate where the boundary was between the out of phase spots. However, when the frequency of the flicker of the spots increased to 15 Hz subjects were no longer able to tell that the spots were flickering in counterphase. Thus, phenomenally one would think that the stimulus would have looked to them to be uniform. However, subjects experienced a "phantom contour" where the border was between the spots that were flickering in counterphase. Subjects could also experience movement of the phantom boundary when the stimulus was changed so that which spots were in counterphase was altered. Rogers-Ramachandran and Ramachandran state, "We were quite surprised, therefore, to observe a distinctly visible horizontal border separating the two fields, i.e., one sees a texture border defined by indistinguishable elements. We call this paradoxical percept a phantom contour" (1998: 71). If the spots in question were red and green, rather than black and white, the boundary could be detected in similar conditions, so long as the spots were not isoluminant. The spots had to have different luminance values in order for the effect to occur.

Rogers-Ramachandran and Ramachandran claim:

> Taken collectively, these findings indicate two different systems exist in human vision. One of these is a fast contour-extracting system that can signal contours but not their polarity and the other is a slow system that signals surface qualities. The contour system signals the presence of a border but cannot tell which side of the border is black and which side is white. That is, it can detect that there is a difference between the two sides and also follow high flicker rates, but it cannot signal the direction or the "sign" of the difference. The surface system, on the other hand, can potentially signal the surface characteristics (color and luminance) but at 15 Hz, the speed of flicker is too high for it to follow. Thus, the phantom contour stimulus seems to isolate or selectively activate the fast boundary extracting system. So what is perceived is the output of the contour system alone, a contour defined by two surfaces which look identical. (1998: 74).[32]

If Rogers-Ramachandran and Ramachandran's report is correct then not only does the brain register that there is a boundary without registering which properties lie on either side of it, this information is also reflected in the nature of the experience had when looking at the stimulus. One experiences a uniform surface (albeit it one with apparently uniformly flickering dots on it) yet one experiences some boundary. Rogers-Ramachandran and Ramachandran say the border is experienced in virtue of "indistinguishable elements" (1998: 71) that "look identical" (1998: 74). Given that, it would be arbitrary which side of the boundary was signaled to be light and which dark, and given that the brain cannot discriminate the flickering dots, there is good reason to think that their description of the experience is correct.

[32] They go on to discuss whether these two pathways correspond to the magnocellular and parvocellular pathways.

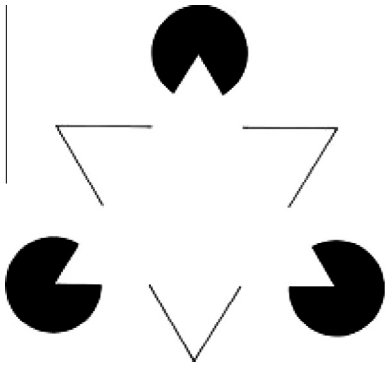

Fig. 2. A Kanizsa Triangle.

In addition to one interpretation of the case of MS, phantom contours provide another example of an experience of distal form with no difference in experienced colour or texture forming the boundary or existing across the boundary. As mentioned previously, such cases lend weight to the supposition that there could be experiences of pure distal form without colour, for in these experiences it is not in virtue of experiencing colour boundaries that one experiences form. Thus they lend weight to the supposition that colour is not a structural feature of experience. In turn this backs up the idea that showing that people with type 2 blindsight lack experiences of colour does not show that they lack visual experience.

Moreover, as also mentioned previously, the existence of this kind of experience suggests that one account of the experiences of those with type 2 blindsight could be accurate: that they experience a uniformly black or dark grey background and yet form and movement within. This case of phantom contours provides evidence not just of form, as the case of MS does, but of movement perception in such conditions. This is because Rogers-Ramachandran and Ramachandran altered the location of the phantom contour by altering the proportion of black to white dots. Subjects reported experiencing the phantom contour moving across their visual field.

Finally, I turn to consider a last case: amodal completion. In order to explain this example, I will first explain what modal completion is. Consider the Kanizsa triangle in Fig. 2.[33] Ordinary perceivers report experiencing a bright white equilateral triangle pointing towards the top of the page that is lighter than the background, and is hence defined by lightness boundaries within experience. That triangle is experienced as partially occluding another triangle pointing towards the bottom of the page that is defined by black lines. Three "pacman-like" figures are also experienced as occluded circles. On close inspection of the figure, one can come to realise that part of this experience is illusory. There are no lightness boundaries forming a triangle pointing towards the top of the page. What is important to notice, for our purposes, is that when one experiences that illusory triangle, one has an experience as of edges created by a luminance boundary. We know that there are no such luminance edges and there is not a difference in lightness where there appears to be one; but that is what we experience. Cases such as this are cases of modal completion because although the edges that seem to form the upward pointing triangle do not exist, one has a visual experience that represents such edges in a way that typical visual experiences do: in virtue of a colour, lightness or texture boundary. With the nature of this case of modal completion firmly in mind, consider now a case of amodal completion.

Consider Fig. 3. When asked, people say that they have a strong sense that it consists in a square that continues behind an occluding circle—hence, that it seems as if the shapes in Fig. 4 are present. However, Fig. 3 is perfectly compatible with the shapes shown in either Fig. 5 or Fig. 6 being present—and hence with a square with a corner removed or with a square with a jaggy protruding extension to a corner being present—as well as with a square being present (Michott et al., 1964/1991). The visual experience of Fig. 3, however, does not consist in experienced boundaries consisting of colour, lightness or texture corresponding the occluded portion of the square. Yet, nonetheless, it is a square that is reported as being present. This is a case of amodal completion, and it contrasts with modal completion in that it occurs when part of an object is experienced as occluded and is reported as having one of many possible shapes, yet the occluded portion of the object is not experienced as being defined by colour, lightness or texture boundaries.

There are two different interpretations of amodal completion. One is that such visual experiences are only of the lines that make up Fig. 3 on the uniform background and that the shape of the occluded figure is inferred, yielding a judgment, thought or belief that an occluded square is present. The second interpretation is that the visual experience is of the lines that make up Fig. 3 on the uniform background and, in addition, the occluded part of the square is represented in the visual experience. A great deal of psychological research has gone into determining which interpretation is correct. Michotte, Thines, and Crabbe (1964/1991) themselves noted that amodal completion occurs despite subjects' beliefs—indeed knowledge—that the occluded figure is not the way that their experience tells them it is. For example, if one first sees that a square with a protruding jaggy corner, as shown in Fig. 6, is present and then it is occluded by a circle, then what is seen will still be experienced as an occluded square, not an occluded square with a protruding jaggy corner. Moreover, that experience persists

[33] Discovery of the phenomenon is often attributed to Schumann (1900). However, interest in modern times was roused by Kanizsa (1955, 1976).

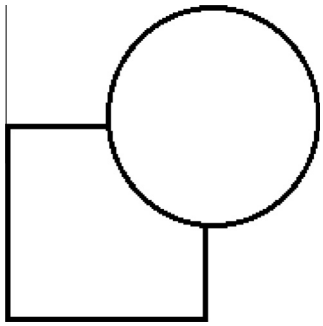

Fig. 3. An illustration of amodal completion.

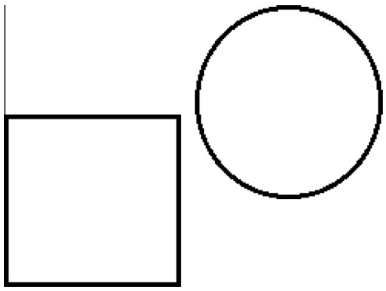

Fig. 4. A square and a circle.

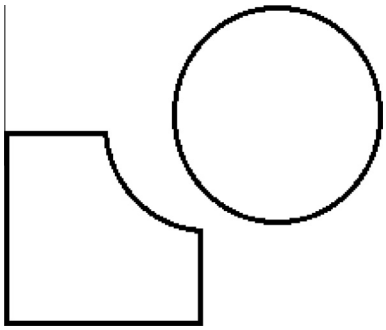

Fig. 5. A square with a corner removed and a circle.

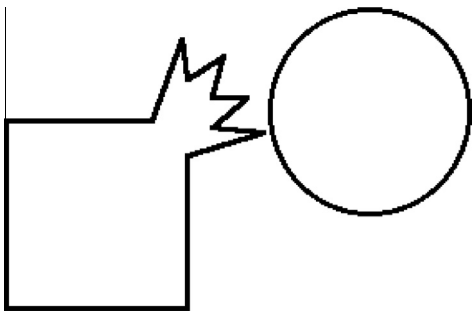

Fig. 6. A square with a jaggy protruding extension to one corner and a circle.

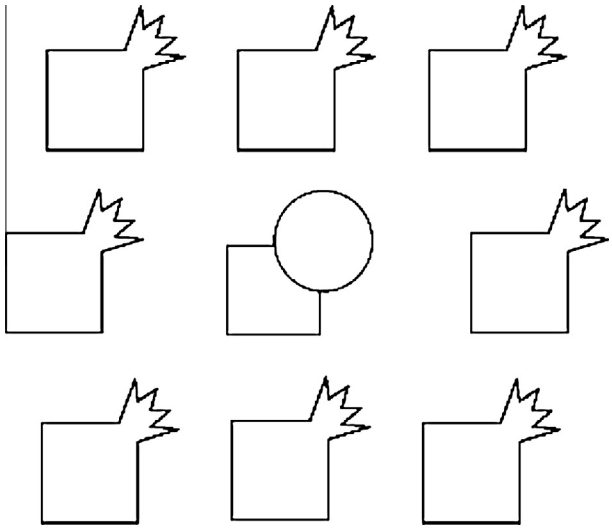

Fig. 7. Amodal completion of the central figure yields an experience as of an occluded square, despite the fact that one experiences multiple jaggy protruding cornered squares being about that are a possible candidates for the nature of the occluded central figure.

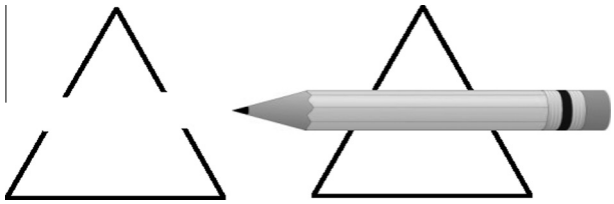

Fig. 8. A pencil occluding a figure known to be a broken triangle yields an amodal experience of a complete triangle.

even if a lot of jaggy protruding cornered squares are experienced. Looking at Fig. 7 should be illustrative. Likewise, if one draws a broken triangle as in the left-hand side of Fig. 8 and then places a pencil over it in the manner depicted in the right-hand side of Fig. 8 then one experiences a completed occluded triangle even when one knows it not to be such.

Using a visual search paradigm, studies have shown conclusively that amodal completion can occur without focused attention and within the time span associated with early visual processing (Enns & Rensink, 1998). And, in a study directly measuring cells' response in nonhuman primates, neurophysiological data show that "cells as early as V1 have the computational power to make inferences about the nature of partially invisible forms seen behind occluding structures" (Sugita, 1999). These results and others are summarised in Wagemans, Lier and Scholl (2006) and strongly suggest that the occluded parts of objects are experienced visually—and are not inferred.

Further evidence of the genuinely experiential nature of amodal occlusion phenomena is given by Briscoe (2011). Consider Fig. 9 that is typically experienced as a number of unconnected two-dimensional forms that lie on the same two-dimensional plane of depth. When these elements appear to be occluded by the insertion of oblongs into the picture, as in Fig. 10, the forms previously seen are no longer experienced as two-dimensional, unconnected, and on the same two-dimensional plane of depth. They are experienced as connected, three-dimensional pieces that form a three-dimensional cube. This change in one's conscious experience provides as clear a demonstration as one could hope for that changes in one's experience, rather than thought or propositional attitudes, are brought about by amodal completion.

If this is right, then in amodal completion we visually experience occluded distal form at a distance from our bodies but not in virtue of experiencing an edge, border or form that is experienced in virtue of colour, lightness or texture. Such experiences are therefore very similar to the experiences of phantom contours that I discussed above. Again, these experiences are not ones of pure distal form without colour, but experiences of distal form without an experience of a difference in colour, lightness or texture. Nevertheless, as in the case of MS and the phantom contours, the existence of these experiences lend weight to the idea that there could be pure distal experiences of form. This is because, in these experiences, form is experienced but not in virtue of differences in colour, lightness or texture. Moreover, they may themselves be the sorts of experience that those with type 2 blindsight have.

It would be interesting, and potentially informative, to ask people to compare and contrast the phenomenal character of their experiences of amodal completion with their experiences of phantom contours. Similarly, it would be interesting to get MS to compare his experience of form defined by differently coloured but equiluminous areas with his experiences of these other phenomena.

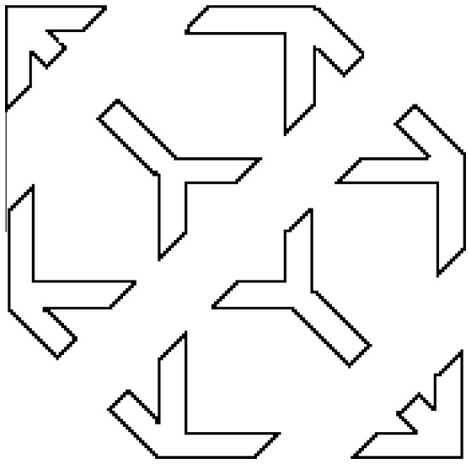

Fig. 9. The elements look to be unconnected two-dimensional forms that lie on the same plane of depth.

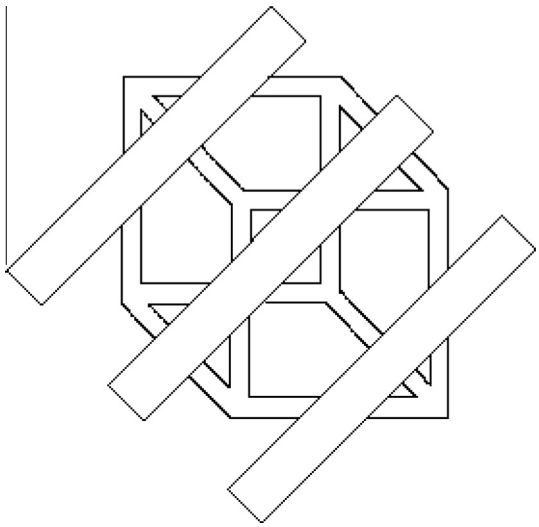

Fig. 10. When the elements of Fig. 9 are interspersed with oblongs, the oblongs are experienced as occluders of a three-dimensional cube.

I have discussed four types of unusual perceptual experience. I argued that if people trained to use TVSS do have new perceptual experiences, then the best account of the experience of a trained congenitally blind person who was using such a device is that they have a perceptual experience of pure distal form without colour. The case of MS has two interpretations. On one he has a perceptual experience of distal form in virtue of alien colours. On another he experiences distal form without experience a difference in colour (chromatic, achromatic, or alien). I have also argued that the case of phantom contours and amodal completion show that there can be experiences of distal form without any differences in colour, lightness or texture. The existence of these experiences lends weight to the suggestion that there could be perceptual experiences of pure distal form with no experience of colour (including luminance) or alien colour. Moreover, they suggest another description of the perceptual experiences of those with type 2 blindsight for moving stimuli: experiences of form and/or movement within a field of uniform colour, lightness and texture.

We therefore have two plausible candidates for the nature of the perceptual experiences of those with type 2 blindsight: experiences of pure distal form and experiences of distal form without experience of difference in colour, lightness, or texture (but not a complete lack of colour, lightness or texture). Recall that Brogaard (2011, 2012) held that there cannot be visual experiences of pure distal form and hence that we should reject the idea that those with type 2 blindsight are having perceptual experiences. She holds that we should think that they are having thoughts instead. I have argued that there is no good reason to maintain that people with type 2 blindsight cannot be having perceptual experiences.

Are such perceptual experiences visual experiences? One can imagine someone claiming *a priori* that for an experience to be visual it must be an experience of colour. But I think that such a view would merely be stipulative: a linguistic decision taken on no good grounds. What reason could one have to hold this view, rather than the view that experience of distal form

is sufficient for an experience to be visual? I do not believe that there is any. One might think that one could appeal to the fact that these experiences are caused by light, which is the proximal stimulus of vision and caused by the use of the eye, which is the sensory organ of vision. And to the extent that these are relevant, they point towards the experience being visual. However, as I have already argued above, the modality of an experience is not completely determined by facts such as these, as the case of synaesthetic concurrent experiences show. What is represented by the experience—distal form—is that which is represented by only visual experiences among the human senses, and plausibly the phenomenal character of the experience is most like visual experiences. But are those things enough to make the experience visual? I do not think that there is any fact of the matter here. I do not have space to argue it here, but as I have argued in Macpherson (2011a), not only may the distinctions between the sensory modalities be a matter of degree, the distinctions between kinds of experience may be too.

Whether or not one withholds the epithet of "visual" from such experiences, they are perceptual experiences and, of all kinds of human experience, most like visual experiences—due to the fact that they are experiences of distal form, and caused by light stimulating the eyes. Showing that there is no good reason to rule out that those with type 2 blindsight have perceptual experiences is the crux of the matter in this paper, not whether they should be classed as visual perceptual experiences or perceptual experiences in some other modality. Thus we can resist the idea that we are forced to conclude that those with type 2 blindsight are only having thoughts about movement or distal form, for resisting depends on showing that they could be having perceptual experiences, not visual experiences *per se*.

6. Conclusion

In section four, we saw that people have argued about the nature of the conscious state that is had by people with type 2 blindsight. I argued that the experimental evidence available at present does not settle the matter. I then discussed the argument put forward by Overgaard and Grünbaum (2011) for the conclusion that people with type 2 blindsight must be having visual experiences and argued that it was not sound. This was because it relies on the false premise that the conscious state must be a visual experience because it was caused by a visual stimulus, a visual sensory organ, and early visual processing. This is false because thoughts, beliefs, and perceptual experiences in non-visual modalities, can also have those causes. I then examined the argument given by Brogaard (2011, 2012) for the conclusion that those with type 2 blindsight are having thoughts based on their guessing what is before them. I argued that we lack good evidence that guessing is required to produce the conscious state that people with type 2 blindsight report, and even if it were, that is not enough to show that those people are not having visual experiences. That is because the guessing might cause the occurrence of those visual experiences—perhaps by focusing attention or by some other means. Finally, I turned to address Brogaard's second argument to the conclusion that those with type 2 blindsight were having thoughts and not visual experiences.

Brogaard's second argument supposed that those who were experiencing type 2 blindsight could not be having visual experiences because they experienced pure distal form, that is form without colour (which I stipulated to include black, white and grey). I showed that there is a long intellectual tradition of supposing that visual experiences must represent colour in order to be visual. I noted that colour was one alleged structural feature of visual experience. I also argued in section two, that it is very difficult to establish the existence of any given alleged structural feature of experience and that, just because one has not had an experience that lacks an alleged structural feature, that is not reason enough to establish that the alleged structural feature is indeed one. The example of experiences of novel colours was illustrative.

I set out, in section five, to examine the evidence concerning whether there could be visual experiences in the absence of experience of colour by looking to see if there were any experiences of pure distal form. I argued that there is some, although not conclusive, reason to think that perceptual experiences of the congenitally blind using TVSS might be of this ilk. I also showed that one plausible interpretation of the nature of the experiences of the achromat MS, when he looks at a form delineated by two equiluminant areas that are different in chromatic colour, is that they are of pure distal form. However, there was another interpretation of the nature of the experience of MS that was at least as plausible, and that did not have this consequence. I suggested that further investigation of MS would be instructive, in particular, asking him to compare his experiences of chromatic boundaries with no luminance difference with his experience of phantom contours and amodal completion.

I then showed that the evidence concerning phantom boundaries and amodal completion clearly shows that there could be perceptual experiences of distal form and movement with no difference in colour, lightness or texture differences. And I argued that the existence of such experiences was evidence in favour of thinking that there can be experiences of pure distal form with no colour, lightness or texture. This is because, in such experiences, form and movement are not experienced in virtue of experiencing colour, lightness or texture boundaries. Moreover, I showed that experience of form and movement, or just movement, with no difference in colour, lightness or texture, was a second very good candidate for being the sort of experience that people with type 2 blindsight are having, based on their reports of experiencing darkness and black shadows (in addition to the experiences already considered or of pure distal form and/or movement). If I am right and such experiences are possible, then, contra Brogaard, there is no good reason to doubt that the reports of people with type 2 blindsight could be accurate descriptions of perceptual experiences. Thus, Brogaard's reason for holding that those with type 2 blindsight are not having visual experiences should be rejected.

I discussed whether experiences of pure distal form and experiences of distal form with no difference in colour or texture should be thought of as visual. I said that they are more like ordinary visual experiences than experiences in any other

modality. Moreover, I claimed that there is no good reason to deny that such experiences are visual. Denying it would merely be a stipulative manoeuvre. In any case, what is important is whether there is any good reason to deny that the conscious states of those with type 2 blindsight are perceptual experiences, and I have argued that there is not. The matter was only originally discussed in terms of visual experiences as that modality seemed the most likely one for the experiences to belong to.

Removing Brogaard's reasons for denying that people with type 2 blindsight are having perceptual experiences does not establish that they are doing so. However, it leaves open the possibility that they are. Further investigation of the phenomenon is clearly called for. In light of the arguments given in this paper, I suggest that it would be good to give those with type 2 blindsight experiences of phantom contours and amodal completion in their non-blind visual fields, and ask them to compare those experiences to the conscious states that they report when their blind field is stimulated, and to see if they are willing to accept that there is a phenomenal match—that those experiences are the same subjectively.

In conclusion, I have taken steps forward in the investigation of three alleged structural facts about experience:

(i) the necessary experience of colour in visual experience
(ii) the necessary experience of colour in experience of distal form and movement, and
(iii) the necessary experience of difference in colour in experience of distal form and movement.

I have provided evidence against each being true. Even if some of these steps turn out to be small steps forward, that any steps have been taken makes them significant ones, given the difficulties that attend establishing or dismissing the structural features of experience.

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