Title: Bálint's syndrome, Object Seeing, and Spatial Perception

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Abstract: Ordinary cases of object seeing involve the visual perception of space and spatial location. But does seeing an object require such spatial perception? An empirical challenge to the idea that it does comes from reflection upon Bálint's syndrome, for it is supposed that in Bálint's syndrome subjects can see objects without seeing space or spatial location. In this paper, I question whether the empirical evidence available to us adequately supports this understanding of Bálint's syndrome, and explain how the aforementioned empirical challenge can be resisted.

1. Introduction

In looking out to an apple tree in the park I see an apple on the tree. My visual experience involves a space which I see, which includes the apple, and in which I see the apple as spatially located and related to other things—other objects, but also other spaces. I see the apple as located in a subregion of this space, as in front of me, as to left of a bench in the distance, and so on. Ordinary cases of object seeing involve the visual perception of spatial location and space. But is such spatial perception *required* for object seeing? That is, does the following hold:

> **Spatial Perception Requirement (SPR)**
> Seeing an object requires

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(A) seeing the object as located in space, and
(B) seeing some of the space occupied by the object.[1]

(SPR) is a bold and interesting philosophical claim about seeing.[2] But (SPR) has to be considered alongside relevant empirical findings about visual perception and visual spatial perception. But then (SPR) seems to be falsified by empirical findings about Bálint's syndrome—a pathological visuospatial disorder to be described further below. For these findings suggest that in Bálint's syndrome, object seeing is present yet visual perception of spatial location and space is absent. This is the challenge to (SPR) from Bálint's syndrome.

The challenge involves the claim that in Bálint's syndrome visual spatial perception is absent—I call this the *absence claim*. As we'll see, there is empirical evidence which supports the absence claim, and on the basis of this it has found favour in some recent philosophical discussions of Bálint's syndrome (Campbell (2007, 2012), Schwenkler (2012))[3]. Here I will argue that philosophers have been too quick to endorse the absence claim simply on the basis of the empirical evidence.

This is not because there is any problem with the empirical evidence or with the way it is handled by experimenters. The problem, I will argue, is that subtly different conclusions about the visuospatial deficit involved in Bálint's syndrome, with different philosophical implications, are equally consistent with the data: there is the absence claim, but there is also, I will suggest, the more moderate *limitation claim*: the claim that individuals with Bálint's syndrome have *severely limited* visual spatial perception (in ways to be spelled out below). If I am right about this, then philosophers who endorse the absence claim face a hitherto unaddressed challenge: that of explaining why it is the absence claim and not the limitation claim that characterizes the visuospatial deficit involved in Bálint's syndrome.

Given this, we can resist the challenge from Bálint's syndrome to (SPR) on the grounds that it is not adequately supported. Since the challenge to (SPR) requires the absence claim, but, if I am right, that claim is not yet adequately supported over a rival claim which doesn't cause trouble for (SPR)—the limitation claim.

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[1] Note that a more epistemic understanding of (a), which we might express in terms of one seeing that the object is located, is not intended here. What is in focus is not the idea that seeing an object requires some epistemic achievement to do with location, but, rather, the idea that seeing an object requires a visual experience of the object as located in space, or to put it another way, as in a place. Thanks to an anonymous referee here.

[2] Schwenkler (2012) discusses a thesis which entails (SPR), the 'Apriority Thesis' (p. 314). Schwenkler's article contains instructive discussion of work by proponents of the A Priority Thesis (and thus (SPR))—such as Kant (1781/1787) (on which see also Warren (1998), and Cassam (2005, 2007)), Wittgenstein (1975), and Husserl (1997) – and their reasons for endorsing it.

[3] Though see fn. 7 below on whether Schwenkler really does endorse the absence claim.

The crucial point I'll argue for, then, is that the empirical evidence we have about the visuospatial deficit involved in Bálint's syndrome which leads philosophers to endorse the absence claim doesn't decide between the absence claim and the limitation claim. This is relevant for the discussion of (SPR) and debate about what seeing an object requires. But setting out the distinction between these different claims about the visuospatial deficit involved in Bálint's syndrome should also be relevant to future work on Bálint's syndrome which seeks to establish precisely what the nature of the visuospatial deficit it involves is.

In (§2) I describe Bálint's syndrome. In (§3) I spell out the challenge from Bálint's syndrome to (SPR). In (§4) and (§5) I discuss the empirical basis for the challenge. In (§6) I argue that the challenge to (SPR) can be resisted. Before I proceed, a few words about how I am understanding object seeing and (SPR).

First, in talking about 'objects' I restrict attention to just *spatial* objects: things which exist in space and have spatial features such as shape and extension. Such things include material objects—ordinary solid bodies such as apples and books—but also two-dimensional objects like (token) letters, words and shapes. Second, the focus is on *conscious* seeing/visual perception. I understand conscious seeing to involve visual experience where things visually appear certain ways to a subject. I thus understand object seeing to involve visual experience of an object in which the object visually appears certain ways to a subject. Consequently, then, it would be no defence of (SPR) to show that though conscious visual perception of spatial location and space is not required for seeing an object, *unconscious* visual perception or representation of spatial location and space is (for more on this see (§4) below). Third, I talk throughout of seeing and/or visual perception, whereas some of the other authors I discuss sometimes talk of visual representation. I don't think that anything of substance hangs on this. And for all I say it might be that seeing or visual perception of objects, space and spatial location is a species of visual representation. Thus if one is troubled by the discrepancy in vocabulary one can understand talk of, e.g. *seeing O* instead as *visual representation in which O is seen* or *visual representation of O which satisfies whatever the further conditions are on seeing O* or something along those lines.

2. Bálint's syndrome

Bálint's syndrome is a visuospatial disorder defined in terms of three main deficits: simultanagnosia, optic ataxia, and optic apraxia. Simultanagnosia is the inability to see more than one object simultaneously, optic ataxia is an inability to reach accurately for seen objects, and optic apraxia is a condition whereby gaze remains fixated despite a lack of a problem with eye movement.[4]

[4] See Bálint (1909), published in English translation in Bálint and Harvey (1995). The syndrome is sometimes called 'Bálint-Holmes Syndrome' (Milner and Goodale (2006)), to acknowledge the important work of Holmes (1918) and Holmes and Horrax (1919).

Here I'll discuss the syndrome by drawing on work by Lynn Robertson (and colleagues), and in particular, findings about RM, a patient with Bálint's syndrome.[5] RM's condition has been variable (see Robertson, Treisman, et al. (1997, p. 297)), but I'll focus on those reports of RM's abilities when they are at their worst. More details will come below. But to begin, we can get a clearer idea of Bálint's syndrome by looking to Robertson's description of its manifestation in RM:

> Single objects popped in and out of view in RM's everyday life… an object continued to be perceptually present for a while and then was replaced by another object or part of an object without warning **[simultanagnosia**]. However, the spatial location of the object or part he perceived at any given moment was unknown to him.[6] RM was unable to accurately reach in the direction of the object he saw (whether with his right or left hand), producing random movements until his hand happened to bump into the object [**optic ataxia**]. He would then readily grasp it. Neither could he verbally report the object as being to the left or right of him or towards his head or feet. His location errors were not due to spatial confusion, as he could readily report that his right or left hand or the right or left or upper or lower part of his back had been touched. He would accurately follow instructions to touch his upper left arm with his right index finger or to grab his right ear with his left hand. He could also follow commands to move his eyes or hands to the right or left, up or down, although eye movements were initiated slowly. The spatial frames of his body were intact. Despite an intact body-centered frame of reference, he was dismal at determining where items were that were placed in front of him even when they remained in full view (Robertson (2004), p. 158).

Robertson also reports that RM manifested optic apraxia (p. 158), but the key symptoms which will play a role in the discussion below are simultanagnosia and optic ataxia. As Robertson and colleagues note elsewhere, optic ataxia was 'pronounced' in RM, 'he could not reach accurately toward objects, and was unable to use a pencil to place a mark within a circle (Robertson, Treisman, et al (1997, p. 297), see also G. C. Baylis and L. L. Baylis (2001)).

3. The Challenge from Bálint's syndrome

It is tempting to characterize Bálint's syndrome in terms of both a *presence claim* and an *absence claim*: individuals with Bálint's syndrome have visual experiences where object

[5] Robertson (1999, 2003, 2004), Robertson and Treisman (2006), and Robertson, Treisman, et al (1997), Friedman-Hill, Robertson, Desimone, et al. (2003) and Friedman-Hill, Robertson, and Treisman (1995). For cases studies of other patients see the aforementioned works by Bálint and Holmes, and Luria (1959), Coslett and Saffran (1991), Humphreys et al (2000) and Gillen and Dutton (2003). RM had damage to both parietal lobes caused by stroke. As Chechlacz and Humphreys (2014) note, the syndrome has been reported to result from various other aetiologies (p. 1), see also Andersen et al (2014, pp. 968–969).

[6] Elsewhere, Robertson and colleagues put it like this: 'RM had… completely lost his ability explicitly to represent space' (Robertson, Treisman, et al (1997), p. 302).

seeing is present, but where spatial location and space perception is absent. To keep the discussion focused and tied to the evidence to be considered below, let's restrict the view and the discussion to follow to RM, thus:

> **The Presence Claim:** RM can see objects (though only one at a time).
>
> **The Absence Claim:** RM cannot see spatial location or space.

If this view is correct, then (SPR) is false in both its aspects. To evaluate this challenge to (SPR), we need to see what grounds there are for these claims. I begin with the absence claim (§4), and then discuss the presence claim (§5).

4. The Absence Claim

As noted above, the absence claim has found favour in some recent philosophical discussions of Bálint's syndrome. Thus Campbell (2007) remarks that 'R.M.… had no spatial awareness' (pp. 549—550); and 'what R.M. lacks seems to be specifically conscious spatial perception' (Campbell (2012, p. 69)). And Schwenkler (2012) notes that '[RM's object perception is] achieved without representing space itself' (p. 322), and 'RM perceived shapes that did not appear to be in space at all' (p. 325).[7]

[7] These remarks indicate that Schwenkler (2012) is committed to the absence claim. But one might suggest that Schwenkler is committed only to a more specific claim, namely that RM is incapable of 'visual spatial awareness in the strict sense, i.e., of such objects and their intrinsic spatial properties as positioned within a *larger* space' (p. 322, my emphasis). And this accords with the thesis that he takes Bálint's syndrome to put pressure on: the thesis that 'at least in the domain of visual experience, it is impossible for there to be spatial perception (i.e. perception of spatial objects, properties and relations) without the awareness of space (i.e. 'space in the strict sense', or an overarching and somehow 'absolute' space within which everything is perceived as situated')' (p. 314).

But it is not obvious that Schwenkler is committed only to the more specific claim. He is naturally read as committed to the specific claim because of a commitment to the more general absence claim. For there are many remarks in addition to those quoted in the main body of the text which suggest that he accepts the absence claim: '[RM] was unable to localize the objects he saw' (p. 315); 'RM could detect a target stimuli well enough; he just couldn't tell where they were, either on the screen itself or with respect to other things' (p. 316); 'on RM's own account, he… seems to have experienced those things as having no visually apparent location or orientation whatsoever' (p. 316); 'it was precisely the capacity visually to experience particular things as located and oriented in space that RM's neurological condition seems to have extinguished' (p. 316); 'RM… lacked any visual awareness of how such figures were located and oriented in space itself' (p. 318).

If, however, Schwenkler doesn't intend to be read as endorsing the absence claim, then we can take my discussion as more in harmony with Schwenkler than is suggested in the main body of the text. What my discussion then brings out is *why* the absence claim *might not* hold of RM, even given the empirical evidence (see §6).

The absence claim is partly supported by the symptoms of RM's condition. But further data in support comes from results from various tests of RM's visuospatial abilities, and from observations about RM's condition by clinicians and experimenters. I'll now summarize some of the relevant data.

4.1 Relative Localization

In simple experiments designed to test RM's visual awareness of location, it was found that it was highly deficient. To confirm this, RM was asked to judge the relative locations of letters presented simultaneously on a computer screen: an X relative to an O. In one block of trials, RM was asked to report whether the X was to the left of or to the right of the O, in another block he was asked to report whether the X was above or below the O. In these trials RM performed no better than chance (Friedman-Hill, Robertson, and Treisman (1995, p. 854)).

4.2 Localization Within a Frame

Similar results were found when RM was asked to judge the locations of words (which he could identify) in a frame (Robertson, Treisman, et al (1997, p. 298)). RM was presented with either the word UP or DOWN at either the top or bottom of a space within a black rectangular frame against a white background. He was asked to report on whether the presented word was at the top or the bottom. What were the results?

> His performance was at chance…, showing no ability to localize at all. Throughout the trials he protested that he could not locate the word even though he could see it. He had to be coaxed to guess, and he typically shook his head and named the word instead (p. 298).

4.3 Within-object Localization

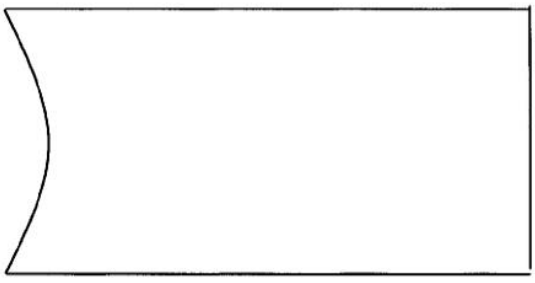

Figure 1 A shape with a curve used in trials with RM, from Robertson and Treisman (2006, p. 450)

RM also had problems with location perception *within* objects: that is, with locating the parts of objects he sees. RM's part localization abilities were tested and the results reported in Robertson and Treisman (2006). In some trials RM was shown a rectangular shape with a

curve on one side (Figure 1). In the trials RM did well at detecting the presence of the curve, but he performed poorly in accurately reporting whether the curve was on the left or the right, or at the top or bottom (pp. 453—54).

In other trials RM was presented with either ON or NO. In one set of trials RM's task was to identify which word was presented, in another RM's task was to localize the parts of the word. Robertson and Treisman found that RM's identification abilities were good (though not perfect), but his localization abilities were very poor:

> RM was at chance in locating the "N" relative to the "O", averaging 51% correct overall. He showed a strong bias to report the "N" to the left of the "O". He clearly had no information at all about the relative locations of the two letters when asked the localization question, but… he did have some information about the identity of the word (Robertson and Treisman (2006, p. 456—457)).

This provides further evidence of RM's poor within-object localization abilities. But the results here deserve further discussion, since it is puzzling that RM was poor at localizing letters, yet relatively good at identifying the words. I will raise and discuss two questions about this.

First, why doesn't RM report where the N is relative to the O given that he can visually identify NO?

The trials in which RM was tested for localization were *separate* from the trials in which he was tested for identification. RM was not asked first to identify the presented word and then complete a localization task. He was simply asked to complete a localization task. I would suggest, then, that in a task where RM was simply asked to say where the N was, he struggled because of simultanagnosia. When presented with NO, there are (at least) three potential perceptual units for RM: N, O, and NO. The suggestion is that because of simultanagnosia, RM could not perceive each of these as perceptual units in their own right at the same time. Thus when asked to say where the N is relative to the O, he presumably wasn't able to survey the N and the O at the same time (along with the whole, NO), and solve the localization task in a way that might be straightforward for one without simultanagnosia. But note that this is just a suggestion based on what we know about RM and simultanagnosia, rather than an experimental report.

Second, how is it that RM is relatively good at identifying and discriminating ON and NO given that these are individuated in terms of spatial location information that RM is said to lack visual awareness of?

Robertson approaches this question by suggesting, first, that there is an effect of word familiarity: 'the more familiar the word was the more top-down information influenced his ability to perceive the word as its proper whole' (Robertson (2004, p. 180)). This hypothesis was confirmed in further localization and identification trials where RM was given unfamiliar strings, OZ or ZO. It was found that RM was 'no better than chance at *either reading the word* or localizing one of its letters' (Robertson (2004, p. 180), my emphasis). Presumably Robertson's idea is that when presented with a familiar figure such as NO a representation

of a relevant word template is triggered, and this somehow influences RM's perception of the stimulus so as it is identified as NO.

But this is only part of the story. Since without explicit awareness of the relative locations of the parts, it is not clear why a template for the word *no* should be represented when presented with NO as opposed to one for the (also familiar) word *on*. Thus here Robertson appeals to implicit spatial information:

> when we asked him [RM] to read the word NO or ON in other blocks of trials he was 69% accurate (clearly not good, but significantly better than when his task was to locate the N). Although he could not explicitly access the location, there was evidence of some implicit encoding of spatial information that influenced the identification of the word (Robertson (2004, p. 180))

Robertson's idea is that though RM lacks explicit awareness of the relative location of the N to the O, some spatial information is processed below the level of awareness which somehow helps RM to discriminate NO from ON.[8] I take it that the idea is that the implicit spatial information somehow influences which word template is represented. There may be residual puzzlement about RM's inability to explicitly localize the constituent letters of NO (or ON) given his relatively good identification abilities. I return to this, and some assumptions which might underlie it, in (§6.1.2).

4.4 Orientation

A further deficit of spatial perception that RM had was to do with orientation. RM was shown large letters, T or A, and asked to report on their orientation: upright or inverted. What Robertson and colleagues found was that though RM could see and recognize the letters, he performed poorly on the spatial task:

> He correctly named the letters T or A on every trial except one, but made many errors in naming their orientations, averaging only 61% correct. He showed a strong bias to report the letters as upright, averaging 12 out of 14 correct when they were in fact upright (86%), but only 5 out of 14 trials (36%) when they were inverted. Thus… he tended to see the familiar version regardless of which orientation was presented (Robertson, Treisman, et al (1997, p. 300). See also Friedman-Hill, Robertson, Desimone, et al (2003)).

In other tests RM was shown schematic, hand-drawn faces (Robertson, Treisman, et al. (1997, p. 299)). He was able to see the faces and identify them as such—accurately reporting whether he was presented with a normal as opposed to a jumbled face. However,

[8] This is consistent with various other findings suggesting that RM implicitly encodes much spatial information below the level of awareness, see e.g. Wojciulik and Kanwisher (1998), Kim and Robertson (2001), and for a survey see Robertson (2004, Chapter 5). For helpful discussion see Campbell (2007, p. 550ff) and Schwenkler (2012, pp. 323—25).

'he was unable to report the orientation of the faces above chance levels' (Robertson and Treisman (2006, p. 460)).

In Robertson, Treisman, et al (1997) discussion of RM's problems with orientation perception are included in a section on spatial localization (p. 297), along with discussion of the localization deficiencies we've already considered. Why is that? To bring out one way to make sense of this, consider seeing the letter A as upright. The letter has a top and a bottom, and, plausibly, perceiving it as upright involves perceiving its top as above its bottom, whereas perceiving it as upside down involves perceiving its top as beneath its bottom. Thus such orientation perception involves part localization. Given this, we can understand why Robertson and others are happy to include orientation perception deficiencies as among the considerations that support the claim that RM has lost the capacity to visually perceive spatial location.

4.5 Depth Perception

Problems of depth perception are often manifest in individuals with Bálint's syndrome. Drawing on Rafal (2001), Robertson notes that

> depth location problems can be easily observed in clinical evaluation. Such patients cannot report how far away an object that they see may be from their own body or whether it is moved towards or away from them by the examiner. They also do not show a normal reflexive blink response when an object looms towards them, consistent with the view that the object's location in depth is not detected (Robertson (2014, p. 1066))

What about RM? Robertson and colleagues report that he too manifested such problems of depth perception:

> Depth perception was severely impaired and he could not judge the distance of objects from him or tell which of two objects was closer to him (Robertson, Treisman, et al (1997, p. 297)).

Such problems of depth perception indicate that RM had problems seeing objects as located in relation to himself.

4.6 Guesses and Reports

In addition to the above, the claim that RM's visual perceptual life involves a lack of spatial location and space perception is supported also by (i) the impression that RM was often guessing in the trials, given that he had to be prompted to respond, and (ii) the fact that RM's first person reports indicate such a lack. For instance, 'he protested that he could not locate the word even though he could see it' (Robertson, Treisman, et al (1997, p. 298)), and 'he often made statements like, "See, that's my problem. I can't see where it is."' (Robertson (2004, p. 158)).

4.7 Summary

RM's condition cannot be put down to problems of spatial cognition more generally. Robertson and colleagues determined by tactile means that RM could understand, say, the differences between up, down, left and right (1997, p. 298). RM seems to have had problems with specifically *visuo*spatial perception.

Note that the absence claim is not that RM systematically *misperceived* spatial location and space. It is rather that the relevant spatial information is simply not consciously available to RM. We've considered various data points which together support this conclusion:

(a) Simultanagnosia: inability to see more than one object at a time.
(b) Optic ataxia: inability to accurately visually guide actions.
(c) Relative localization: deficient localization of objects in relation to each other.
(d) Localization within a frame: deficient localization of objects relative to a frame.
(e) Within-object localization: deficient localization of the parts of objects relative to each other.
(f) Orientation: e.g. inability to see a shape as upright.
(g) Depth perception: e.g. deficiencies in perceiving the distance of an object from oneself.
(h) Guesses and Reports: the sense that RM is guessing where objects are, and his reports that he can't see where objects are.

The absence claim involves two hypotheses which constitute a plausible explanation of this data:

> **Absence hypothesis 1 (AH1):** RM cannot see spatial location.
>
> **Absence hypothesis 2 (AH2):** RM cannot see space.

(AH1) is short for the claim that RM is incapable of seeing the things he sees—whether objects or parts of objects—as located in space.[9] Since (b)—(h) all indicate serious deficiencies of visual spatial location perception, (AH1) is a plausible explanation of this data. Further, one might think that this also supports (AH2). For if RM cannot see space, then this goes some way to explaining why he cannot see things as located in regions of space. Also (AH2) also helps us to make sense of (a): if RM is unable to see space, it is not surprising that he cannot see multiple objects at a given time. Such perception of multiple objects usually involves perception of a space in which the objects are seen as located and spatially related to one and other.

5. The Presence Claim

The absence claim only falsifies (SPR) in conjunction with the presence claim. This further claim is highly plausible. First, the idea that RM sees objects is presupposed in the very idea

[9] When (AH1) is understood in this way, I take it that it implies that RM cannot see things as having *an order* in space, where this would involve seeing an entity as located in such-and-such a place in relation to some other entity. Thanks to an anonymous referee here.

of simultanagnosia and optic ataxia. In exhibiting simultanagnosia RM can *see an object*—just one at any given time. In exhibiting optic ataxia RM cannot properly coordinate his reaching to *the object he sees*. Thus, absent a compelling reason to re-think these symptoms, we should admit that RM can see objects. Second, in the experimental literature summarized above, it is assumed that RM can see the stimuli presented in the trials. The setup is often that RM *can* consciously see (and identify, recognize) a stimulus but that he turns out to lack certain forms of spatial perception that usually accompanies such seeing. And RM himself, as we've seen, thinks of himself as able to see such stimuli. Thus, absent a compelling reason to re-think what's going on in these experiments, we should admit that RM can see objects.

And in case one is tempted to construe RM's alleged object perception in terms of the presentation of just *features*, we can note that there is plenty of evidence to suggest that RM sees objects *as such*, as single coherent wholes, as things which have certain properties. This is emphasized well by Schwenkler (2012, p. 318ff). For instance, Schwenkler notes how in one of the letter identification tasks in which RM correctly identified a lowercase 'e'

> it would have been impossible for him to do this had he not perceived the very same object both *as having a curved side* and also *as having a horizontal line through the middle*. Even if there were others of the figure's properties… that he failed to perceive, the content of his visual experience still involved something analogous to the ascription of multiple predicates to a singular referent: he perceived a particular thing as having a complex shape involving multiple figural aspects (p. 321).

In further support of this, Robertson, Treisman, et al (1997) report RM's own description of the way in which he saw a letter Q in some trials: 'when tested in search for a Q among Os he said, "I can see the line and how it comes up and fits in"…' (p. 310).

A related point is to do with colour perception. We have evidence that RM sees objects as having certain colours—thus, again, that he sees objects as things with certain properties. As Robertson (2004) writes

> we asked him to tell us what letter he saw on each trial and its color *as it appeared to him*. ICs [illusory conjunctions] were prevalent over many different testing sessions and exposure durations… When probed about his perceptual experience while performing the task, RM told us that he was reporting the letters as he saw them. He commented with statements like "When I first look at it [the letter], it looks green and it changes real quick to red," the letters on that trial being red and green, or "I see both colors coming together." The colors and letters seemed to randomly join together in his experience (p. 201).

RM is prone to illusory conjunctions in which colours which are implicitly detected elsewhere in the scene are "bound" to the object seen, such that it is seen as having a colour it doesn't actually have. Robertson presents this in terms of the character of RM's awareness, as a point about the way in which RM sees the object: he sees it *as* having a certain colour. In cases of illusory conjunction, the colour that RM sees the object to have is not the colour the object actually has, but the point is that he sees an object *to have* a

colour. His experience thus isn't accurately captured merely in terms of the presentation of features, but of features as *joined* or *combined* as features of a single thing—object perception.

Schwenkler (2012) reads Campbell (2007) as denying that RM sees objects. To this Schwenkler responds that it is a 'misdiagnosis' (p. 320). I agree that this would be a misdiagnosis. But I am not myself certain that this is how Campbell understands things. On an alternative reading, Campbell's claim is that RM sees objects, but that such seeing is *impaired*. Campbell does think that spatial awareness is a cause of object seeing (p. 549). Since he also thinks that RM lacks spatial awareness, does that mean he thinks RM cannot see objects? This doesn't follow unless the claim that spatial awareness is a cause of object seeing is understood as the claim that it is causally necessary for object seeing. But Campbell's claim doesn't take that form. It is rather that if there were an intervention on spatial awareness there would be a difference in object perception (p. 556). And this is what we find: with impaired spatial awareness, RM's object perception becomes impaired (as manifest, for instance, in his difficulty in making certain spatial judgements about objects, and his susceptibility to illusory conjunctions). But impaired object perception is still object perception.[10]

6. Resisting the Challenge

The challenge from Bálint's syndrome to (SPR) is that RM has visual experiences where object seeing is present, but spatial location and space perception is absent. If this is correct, then (SPR) is false in both its aspects. And we've just seen that there are empirical grounds to support the challenge.

I now want to argue that (SPR) is defensible in both its aspects. There are different approaches one might take here. One would be to argue that the presence claim is false. Another would be to argue that the absence claim is false, and to positively claim that RM can see spatial location and space. I pursue neither approach. My approach is more modest: I will argue that the absence claim is *not adequately supported*. This is because the evidence we've considered doesn't decide between the absence and claim and a rival claim which doesn't cause trouble for (SPR) when combined with the presence claim, namely:

> **The Limitation Claim:** When RM sees an object he has *severely limited* visual perception of the object as located in space, and *severely limited* visual perception of space.

The way I will argue that the evidence doesn't decide between the absence and limitation claims is by highlighting three individual limitation hypotheses and arguing that each of them is empirically just as plausible as the corresponding absence hypothesis. If I am right

[10] My remarks here pertain just to Campbell (2007). In a later piece, Campbell does seem to deny the presence claim, or at least the claim that RM can see an object as a possessor of multiple features: see Campbell (2012, p. 68ff). The considerations offered by Schwenkler (2012), drawn upon in this section, tell against this.

about this, then the limitation claim is empirically just as plausible as the absence claim. The limitation hypotheses are as follows (all of them pertain to visual perception):

> **Limitation hypothesis 1 (LH1):** when seeing an object RM has only highly unspecific ego-relative location perception.
>
> **Limitation hypothesis 2 (LH2):** when seeing an object RM has only object-centric location perception.
>
> **Limitation hypothesis 3 (LH3):** when seeing an object RM has object-centric space perception in which he sees only (some of) the space the object occupies.

I'll discuss each hypothesis in what follows, and explain the terminology as I go.

6.1 Spatial Location Perception

In regards to (LH1) and (LH2) the corresponding absence hypothesis is (AH1)—that RM *cannot* see the things he sees as spatially located. I will now present two independent arguments for the claim that (AH1) is not adequately empirically supported over (LH1) or (LH2). In (§6.1.1) I argue that (LH1) is empirically just as plausible as (AH1), and in (§6.1.2) I argue that (LH2) is empirically just as plausible as (AH1).

6.1.1 Unspecific Location Perception

Visual perception of an object's spatial location can take different forms. Let's distinguish two familiar forms. One concerns seeing an object as located relative to *oneself*, the other concerns seeing an object as located relative to other objects and spaces which one sees. We can call the first form *ego-relative location perception*, and the second form *allo-relative location* perception

To illustrate this distinction, let's return to the apple example we began with. I can see where the apple is in relation to myself, that is, I see it as there in that subregion of space at such-and-such a distance from me (ego-relative). But I can also see where the apple is in relation to other objects, and other regions of space, that is, I see it as there to the left of the park bench, beneath the bird overhead, and as in a small part of the larger space which I also see (allo-relative). (As I understand it, ego-relative location perception is where one sees an object as located relative to oneself *as subject of the experience* not as a perceived object. So if I place an apple next to me, and then *observe* myself and the apple, though I might thereby see where the apple is in relation to myself (or my body), this will not count as ego-relative location perception).

With this distinction in place, let's return to RM. Given the data we considered above, it is plausible to suppose that RM is incapable of allo-relative location perception. Most obviously (a), (c)-(f) and (g):

(a) Simultanagnosia: inability to see more than one object at a time.
(b) Optic ataxia: inability to accurately visually guide actions.

(c) Relative localization: deficient localization of objects in relation to each other.
(d) Localization within a frame: deficient localization of objects relative to a frame.
(e) Within-object localization: deficient localization of the parts of objects relative to each other.
(f) Orientation: e.g. inability to see a shape as upright.
(g) Depth perception: e.g. deficiencies in perceiving the distance of an object from oneself.
(h) Guesses and Reports: the sense that RM is guessing where objects are, and his reports that he can't see where objects are.

Supposing that RM is incapable of allo-relative location perception explains the inabilities and deficiencies mentioned in (c)—(f), and (h). It is also predicted by (a).

But what about ego-relative location perception? Is RM likewise incapable of seeing an object as located or there relative to himself? Such location perception doesn't involve seeing an object *and seeing* oneself, so it is not ruled out by (a) simultanagnosia. And the problems in (c)—(f) indicate problems with allo-relative location perception but not ego-relative location perception.

But consider now (b), (g) and (h). The fact that RM has the inabilities or deficiencies mentioned in (b), and (g), together with (h), is consistent with the claim that he has lost the ability to locate the objects he sees relative to himself.

To assess this claim let's consider the fact that ego-relative location perception can be more or less specific. Consider again me looking at the apple on the apple tree. I see the apple as somewhere in front of me. But my visual experience specifies more precisely where in front of me the apple is located. Such relatively specific location perception enables me to point accurately to where the apple is, to accurately guide action towards the apple (in, say, reaching for it), and to estimate its distance from me. But now suppose that though I see the apple as somewhere in front of me, my visual experience doesn't specify more precisely where in front of me the apple is located. I see the apple as *somewhere or other* in front of me, but I don't see more specifically where in front of me it is. In this second scenario, ego-relative location perception has not gone missing but *relatively specific* ego-relative location perception has. The ego-relative location perception which remains is highly unspecific.[11]

Consider also seeing the moon as it shines brightly in the sky. One doesn't see where exactly the moon is in relation to oneself, at what distance it is from oneself, etc. Yet one still sees the moon as located roughly somewhere or other.

With this distinction between relatively specific and relatively unspecific ego-relative location perception in mind, we can compare (AH1) to (LH1):

[11] One way to conceive of this is in terms of vision attributing only relatively determinable location properties to objects. For helpful discussion see Stazicker (2011). See also §3.2 of French (Forthcoming).

Limitation hypothesis 1 (LH1): when seeing an object RM has only highly unspecific ego-relative location perception.

Note that (LH1) is a *limitation* hypothesis as it says that RM is capable of ego-relative location perception, but only a limited form of it. And the nature of the limitation here is that insofar as he is capable of ego-relative location perception, it is at best highly unspecific.

What I now want to suggest is that an explanation of the data in terms of (LH1) is empirically just as plausible as that in terms of (AH1).

Regarding (b), if RM has only highly unspecific location perception, he will not be able to accurately reach towards an object. For he will not see specifically where in front of him an object is. Regarding (g), if RM has only highly unspecific location perception, he will thus not be able to see specifically where in front of him an object is and thus struggle to estimate its specific distance from himself. Further, we can understand (h) with reference to the idea that RM has only highly unspecific location perception. Since the trials concerned RM's ability to visually determine the relatively *specific* location of an object in space, the natural understanding of his reports is as pertaining to a lack of such localization abilities.

We can explain the data we've considered, then, with reference to (LH1), and in particular, with reference to an incapacity for specific ego-relative location perception. This shouldn't come as too much of a surprise since the testing of RM concerned his ability to see where *specifically* an object is—even if the tests weren't framed in these terms with the distinction between relatively specific and unspecific location perception in place. In this explanation, no appeal is made to the claim that RM lacks ego-relative location perception altogether. And it is consistent with (b), (g), and (h), and the lack of specific ego-relative location perception, that when RM sees an object he has highly unspecific ego-relative location perception, that he sees it as *somewhere or other* in front of him.

So far we have seen that construing RM's situation in terms of (LH1) instead of (AH1) is consistent with the data about RM's ego-relative location perception deficiencies. But there is an aspect of (LH1) which is not obviously doing any explanatory work in what we've considered so far, namely that RM *does* see objects as located in a highly unspecific way. The explanatory work is being done rather by the claim that he lacks specific location perception. Now this observation doesn't help the proponent of (AH1)—since the point still stands that appeal to (AH1) is not needed to explain the data. But we might wonder if anything can be said in support of the positive hypothesis built into (LH1)—that RM is capable of some form of ego-relative location perception. I now want to suggest that there is something to be said for this positive hypothesis, even though it is empirically an open question whether it is true.

To bring this out, consider the following further data point:

(i) Front directedness of reaching: when asked to reach for an object in front of him RM reaches to the front.

Though RM could not accurately visually guide his action towards a target object in reaching, he would still reach to *the front* for an object presented in front of him, not behind his head, above his head, etc, when asked to reach for objects actually in front of him. Thus, (i). Why is this? One natural explanation is the positive aspect of (LH1)—that he sees the object as somewhere or other *in front of him*.

The point of appealing to (i) is just to bring out how the positive aspect of (LH1) has some defeasible support. It is not to suggest that (LH1) is *better off* than (AH1). If one were to appeal to (i) in arguing that (LH1) is empirically more plausible than (AH1) one would also have to consider what a proponent of (AH1) might say about (i), and then argue that the (LH1) explanation of (i) fairs better. But on this, I think the matter is open.

There are things a proponent of (AH1) might say about (i). For instance, here are two potential alternative explanations of (i) which don't appeal to (LH1). First, one might suggest that when RM is tested for optic ataxia, his attention is cued to the location of the object by auditory or some other means, and this determines the front directedness of RM's reaching by somehow contributing a non-visual sense of where the object is to RM's overall experience of the object. Second, one might appeal to a remembered default. RM came to have his condition following brain damage, but before that presumably he typically saw objects as in front of him. Thus if asked to reach for an object even when not able to see where it is *in any sense*, it would be natural for him to reach in front. The default for reaching in everyone is in front, so perhaps individuals with Bálint's syndrome such as RM reach in front because of this remembered default.[12]

And to these alternatives a proponent of (LH1) can point out that they are not obviously more plausible, empirically, than (LH1)—we have as yet no special evidence to decide the matter. And they might add that there are come-backs to each alternative. Regarding the first, even if we try to explain the front directedness of RM's reaching by appeal to a non-visual cue, for this to amount to an *alternative* explanation than the explanation which appeals to unspecific visual perception of location, we'd need an assurance that the non-visual cue doesn't influence the spatial content of visual experience itself.[13] Similarly with regard to the second, we'd need some assurance that the remembered default could explain front directed reaching without influencing visual experience itself.

In summary, given (i), there is something empirically to be said for the claim that RM is capable of a limited form of ego-relative location perception. But it's not that appeal to (LH1) is the *only* possible explanation of (i). There are alternatives. These are not obviously better explanations, but nor are they obviously worse explanations. The matter is open. Thus my conclusion is not that (LH1) is true, nor is it that it is more plausible than (AH1). The conclusion is just that (LH1) is empirically just as plausible as (AH1).

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[12] Lynn Robertson, in personal communication.

[13] For instructive discussion of cross- and multi-modal perception see Macpherson (2011), Spence (2011) and Bayne and Spence (2015).

6.1.2 Object-Centric Location Perception

At any given time, an object occupies an *object-space*, that is, a region of space defined exactly in terms of the object's boundaries and other spatial features. Normally objects are seen as in these object-spaces, but this is all bound up with allo-relative and ego-relative location perception: objects are seen as there in the spaces they occupy, but in relation to other objects and spaces, and in relation to oneself. And usually, the object-space itself figures as a visible place in a larger space, itself seen. But can an object be seen as there in its object-space when this is *completely disassociated* from such allo-relative and ego relative accompaniments? Can there be a *purely object-centric form* of location perception?

Consider again the case of me seeing the apple on the tree in the park. I see it as one part of a scene involving various objects and spaces (e.g. other apples, the space between the tree and the bench), I see it as in such-and-such a position relative to these other things. I also see the apple as in such-and-such a position relative to myself. So the apple is seen as there, and we can understand this very richly. That is, the apple is seen as there… (i) in an object space which is (ii) visibly part of a larger region of seen space, (iii) at such-and-such a distance from the other apples on the tree, (iv) in front of oneself, (v) to the left of the bench, (vi) above the ground, and so on.

Now consider what we might call *there-stripping*, in which this perception of the apple as there becomes gradually more limited. So imagine that first the ground is no longer perceived. This is one bit of there-stripping—I no longer see the apple as above the ground. Then the bench goes. This is another bit of there-stripping as I no longer see the apple as to the left of the bench. Then suppose I lose a sense of where the apple is in relation to myself. Then other things (apples, the sky, etc) go missing. This is yet more there-stripping as I no longer see the apple as at such-and-such a distance from other things. Now suppose the sense of the space around the apple goes missing in that I no longer see the apple-space as part of a larger region of space. This is more there-stripping, as the apple is now not seen as in some specific region of space identifiable as one among others. As in Bálint's syndrome, the object is still seen.

In the *initial* stages of there-stripping it makes sense to suppose that the apple is seen as located *there* in object-space, as in that space which it occupies. But what about in the final stage? Can it still be seen as there? Perhaps the visual sense of the object as there simply goes missing here. But, since we haven't stripped the object-space itself from the visual perception of the object, an equally legitimate possibility seems to be one on which the subject still has visual perception of the object as located, but in a severely limited or degraded form: *purely* object-centric location perception.

How would such perception be a limited or degraded form of location perception? With only object-centric location perception, the subject would not be able to report the allo-relative or ego-relative location of the object (just as in Bálint's syndrome). To the question of where the object is, the subject could give no more than the unhelpful answer that it is "there, in that space", indicating the object-space. In purely object-centric location perception, the object appears to be located in space, but a space larger than the space the object occupies is not apparent. Thus the subject would be unable to locate the object in a

larger space. The subject would thus struggle to coordinate their own action with respect to the object they see (as we find in Bálint's syndrome), and would be hopeless at directing others to what they see.

Purely object-centric visual perception of location is thus quite unlike the visual location perception involved in more ordinary visual experiences. It lacks allo-relative and ego-relative accompaniment and does not help the subject with spatial problems like coordinating, moving, directing, and so on. None of this suggests that such perception isn't possible or wouldn't be a genuine form of location perception, but just that it would be an extremely limited, useless, and unusual form of location perception.

Thus we can consider the following hypothesis:

> **Limitation hypothesis 2 (LH2)**: when seeing an object RM has only object-centric location perception.

And I will now suggest that (LH2) explains the data just as well as (AH1): So consider again our initial stock of evidence:

(a) Simultanagnosia: inability to see more than one object at a time.
(b) Optic ataxia: inability to accurately visually guide actions.
(c) Relative localization: deficient localization of objects in relation to each other.
(d) Localization within a frame: deficient localization of objects relative to a frame.
(e) Within-object localization: deficient localization of the parts of objects relative to each other.
(f) Orientation: e.g. inability to see a shape as upright.
(g) Depth perception: e.g. deficiencies in perceiving the distance of an object from oneself.
(h) Guesses and Reports: the sense that RM is guessing where objects are, and his reports that he can't see where objects are.

With *only* object-centric location perception, RM lacks the capacity for allo-relative and ego-relative location perception. Thus just as (AH1) can explain (b)—(h), so can (LH2). With only object-centric location perception, RM cannot see where an object is in relation to himself and in relation to other things and spaces, thus we should expect (b)—(h). And (LH2) is consistent with (a)—purely object-centric location perception doesn't facilitate the perception of more than one object at a time.

But let's pause to consider further (e) and (f), which both concern within-object localization (given what we said about orientation perception in §4 above). One might have the following concern. RM cannot see where parts of a perceptual unit such as NO are relative to each other. Yet if he can see the NO as there in the NO-space, presumably he also sees the N and the O as in that space, and should thus be able to localize them.

But there are two unwarranted assumptions here. First, even if one is capable of seeing distinct things as in a (single) space, it is a further question whether one is able to see their spatial relations. Seeing things as spatially located, and seeing things as spatially related are often connected but nonetheless separate visual abilities. The latter is an allocentric visual

ability that one isn't guaranteed to have just by having a capacity to see things as located. Second, for the objection to go through it must be understood as follows: since RM sees the NO as in NO-space, he also sees both the N and the O as in the NO-space *at the same time*. But this can be rejected. Since RM has simultanagnosia, presumably when RM sees the NO as in the NO-space he doesn't at the same time see the N, or the O (at least not as perceptual units in their own right). When he sees the N, we can suppose, he sees *just that*, and as in the N-space (which is not seen as a subregion of the NO-space). (Similarly for the O). Thus we can agree that if RM is capable of seeing NO as in NO-space, he should also be capable of seeing an N as in an object-space, and an O as in an object-space. But that's not the same thing as seeing the N and seeing the O at the same time as in the same space.

Thus I think we can construe RM's location perception problems in terms of (LH2) just as well as in terms of (AH1). This should not be too surprising since the evidence indicates problems of ego-relative and allo-relative location perception. But, like (AH1), (LH2) has it that RM is incapable of such location perception.

But consider now the further piece of evidence introduced above:

(i) Front directedness of reaching: when asked to reach for an object in front of him RM reaches to the front.

Though (i) is not inconsistent with (LH2), (LH2) doesn't help us to understand (i) in the way that (LH1) might.

However, for the purposes of what I want to claim in this section, this point is not troubling. For regarding (i), (LH2) is no better or worse off *than (AH1)*. Just as a proponent of (AH1) would have to look to something other than (AH1) and ego-relative spatial content to explain (i), so too would a proponent of (LH2).

(LH2) can explain the data concerning RM's location perception deficiencies just as well as (AH1). But there is an aspect of (LH2) which is not obviously doing any explanatory work in what we've considered so far, namely that RM *does* see objects as located in object-space. The work is being done rather by the claim that he lacks allo-relative and ego-relative location perception. Now this observation doesn't help the proponent of (AH1)—since the point still stands that appeal to (AH1) is not needed to explain the data. But we might wonder if anything can be said in support of the positive hypothesis built into (LH2)—that RM is capable of object-centric location perception.

To address this, we can add to our data points by highlighting some of what we know about how RM sees objects as being, as discussed in (§5) above. Thus:

(j) Multiple features: RM sees objects as single coherent things with multiple features.

What I want to suggest is that in light of (j), the positive aspect of (LH2) is plausible.

Consider what it's like to see an object as having *multiple* features. When I see an apple to have a certain shape, size, and colour, these features don't show up in the phenomenology

of my experience as separated or disparate. They show up in combination, coherently, as features of single thing. But there seems to be a spatial aspect to the sense of togetherness manifest in the phenomenology of such visual experiences: these different features are seen as together, and as with the object, located in the same region of object-space. One way to make sense of this aspect of phenomenology is by appeal to the idea that the object is seen as being there in object-space where the features also appear. Note that this is a point about *phenomenology*, not about whatever visual processes may underpin experience's exhibiting such unity. The point is that insofar as objects are presented in experience as having multiple features at a time, as features of a single coherent thing, there is a phenomenologically manifest sense of unity or togetherness which has a spatial aspect to it.

Returning to RM, and applying these ideas, the thought is that one way of making sense of (j) is by appeal to object-centric location perception. Thus the positive aspect of (LH2) has some support.

I am not claiming that we *have* to accept (LH2) in the light of (j). One might try to argue that the sense of togetherness of features and object, as manifest in the phenomenology of such experiences is not as I've described it. Or one might agree that it is as I described it, yet resist the idea that this should be made sense of in a way that appeals to seeing the object as located in object-space. Maybe, that is, there can be such a thing as seeing the object and some of its features as *co-located* without seeing the object or its features as located in object-space.

The point, then, is not that we can only make sense of (j) by appeal to (LH2). Whether (LH2) is ultimately to be accepted is empirically open. But given that (LH2) explains the data about RM's visuospatial deficiencies just as well as (AH1), and given that its positive aspect has some defeasible support, we can conclude that (LH2) is empirically just as plausible as (AH1).

6.2 Space Perception

Is RM incapable of seeing space, as (AH2) claims? Above we noted that we might invoke (AH2) to further explain RM's location perception problems. We also noted that (AH2) can help us to make sense of (a), simultanagnosia. But an alternate hypothesis here is (LH3):

> **Limitation hypothesis 3 (LH3)**: when seeing an object RM has object-centric space perception in which he sees only (some of) the space the object occupies.

I want to suggest that (LH3) is empirically just as plausible as (AH2).

The idea behind (LH3) is not that RM has lost the capacity to see space, but rather that his capacity to see space has become severely limited such that he can see no more than (some of) the object-space of whichever object he sees at a time.

What about the idea that such space perception is *object-centric*? By this I mean that which space RM can see at a given moment is determined by whichever object he sees at that

moment and the spatial features of the object (such as its shape and extent). The idea is that the spatial structure of RM's experience, insofar as it involves perception of space, is beholden to whichever object he happens to see. This is quite unlike how things are in ordinary visual experience. In ordinary visual experience the spatial structure of experience is not likewise beholden to whichever objects one sees. In ordinary visual experience, one takes in a large region of space, the limits of which are determined by one's own sensory limitations.[14]

RM and Bálint's syndrome aside, I think the idea that one can see object-spaces is plausible. Consider again the example of seeing an apple. I see the apple on the tree and it looks to have a certain shape and size. It is natural to suppose that I can see the apple *and* the space the apple occupies—the apple-space. In looking at the apple it might not occur to me that I can also see the apple-space (if I am focusing on the apple), but once prompted, the idea that this space can be seen seems intuitive. I can trace it or frame it (guided by the apple's boundaries). I can see the extent of the space by looking to the apple and observing its extension. I can see the shape of the space by looking to the shape of apple. The apple itself, in this apple-defined region of space, doesn't seem to occlude or otherwise exclude perception of the very region of space it occupies.

Let's return, then, to RM. How does (LH3) compare to (AH2)? If it were to turn out that RM *does* enjoy limited forms of *location* perception—something I argued is empirically open—then we should expect (LH3) and not (AH2) to be true. However, even if we suppose that RM is incapable of visual perception of spatial location, (LH3) fairs just as well as (AH2). For if RM's space perception is object-centric and limited just to the space of the object he sees, we should not expect him to be capable of allo-relative location perception. And if RM's space perception is object-centric and limited just to the space of the object he sees that should no more facilitate ego-relative location perception than does purely object-centric location perception. Furthermore, (LH3) helps us to make sense of simultanagnosia. With space perception limited to just the space of the object he sees, and determined by the spatial features of the object he sees, we should not expect RM to be able to see more than one object at a time.

But if RM could see the object-space of a letter A which he sees, would that help him to see the A as *upside down*? No. Let's suppose that seeing an A in this way requires seeing the top of the A as pointing down in a region of space. But this requires the top of the A to visibly dissociate from the top of the space. Thus it requires the seen space to be perceived as having spatial structure *independently* of the spatial structure the object is perceived as having. But seeing the A-space doesn't give RM the *independent* space perception which would facilitate such awareness of the A as upside down. For, as noted, the idea is that RM's object-space perception is object-centric.

Schwenkler (2012) agrees that for RM there cannot be such visible dissociation of the sort we've highlighted:

[14] On which see Martin (1992, 1993), Richardson (2010), Soteriou (2011) and Soteriou (2013, Chapter 5). For discussion see Mac Cumhaill (2015).

> for RM there will have been no possibility, for example, of the rotation of the entire visual field, as opposed to the replacement of an object whose intrinsic spatial structure is defined by a certain object-centered frame with an object that is structurally similar but whose intrinsic spatial properties are different, as when the letter 'N' simply transforms into a 'Z' (p. 325).

But he suggests that this means that RM cannot see an object-space:

> if it were true that RM experienced the 'object-space' taken up by an object whose shape he saw, then he would have experienced that object not just as having a top and a bottom and a left and a right, but also as *oriented*, albeit in a region of space fully taken up by it (p. 325).

But I think we need to distinguish various achievements here: seeing an object-space is one thing, seeing an object *as positioned in* an object-space is a further thing. RM may lack certain capacities for position awareness, but it is not clear why that should mean that he cannot see a region of space, set by the object he sees. Some of the spatial features the region of space is seen as having may not be fixed independently of the spatial structure the object is seen as having, but that doesn't mean that the space isn't seen.

What this discussion brings out, I think, is that (LH3) is empirically just as plausible as (AH2). And so consistently with the evidence, we can describe RM's visual condition similarly to how Bálint described the condition of his own patient:

> [H]is visual field was not of a fixed size but rather *had space for one image only* (1909/1995, p. 269, emphasis added)

Bálint presents things in terms of the idea that visual space is limited to the boundaries of the object. This is brought out further in Harvey and Milner's discussion of Bálint's patient:

> The patient's constricted field of visual attention was evidently bounded not in retinotopic co-ordinates, but rather by the contours of the object to which he was attending, whatever its size… (1995, p. 263).

And Robertson and colleagues too describe RM's experience of objects in similar terms:

> Subjectively experienced space seems to collapse down to the space within the currently attended object. The size of this space varies with the size of the object that defines it… (Robertson, Treisman, et al (1997, p. 313)).

My claim is not that this is correct—that (LH3) is true. The claim is just that (LH3) is empirically just as plausible as (AH2).

Finally, let's consider a reaction similar to the reactions considered above regarding (LH1) and (LH2). There is an aspect of (LH3) which is not obviously doing any explanatory work in what we've considered so far, namely that RM *does* have object-centric object-space perception. The explanatory work is being done rather by the claim that he lacks a more

typical form of space perception. Now this observation doesn't help the proponent of (AH2)—since the point still stands that appeal to (AH2) is not needed to explain the data. But we might wonder if anything can be said in support of the positive hypothesis built into (LH3)—that RM is capable of object-centric object-space perception.

To address this, let's again add to our data points by highlighting some of what we know about how RM sees objects as being:

(k) Shape and extension: RM sees objects as shaped and extended.

What I want to suggest is that in light of (k), the positive aspect of (LH3) is plausible.

Consider seeing an object as shaped and extended. I see the apple as being of a certain size, and as having a certain shape. That is, I see the apple as extended and as taking a certain form. One way to make sense of this is as follows: the apple is seen as extending and taking form *in space*, as occupying space. And we can in turn make sense of this by supposing that in seeing objects as occupying space one is also presented with some of the *space* they occupy: the space is presented, and it shows up in experience as what *houses* the modes of space occupancy which appear to one.

Returning to RM, and applying these ideas, the thought is that one way of making sense of (k) is by appeal to object-space perception. Thus the positive aspect of (LH3) has some support.

Again, I am not claiming that we *have* to appeal to (LH3) to make sense of (k). Though it does strike me as a natural way of explaining (k), one might nonetheless try to make sense of the appearance of an object's shape and extension without appeal to the appearance of space. So I'm not claiming that we must accept (LH3). But given that (LH3) explains the data about RM's visuospatial deficiencies just as well as (AH2), and given that the positive aspect of (LH3) has some defeasible support, we can conclude that (LH3) is empirically just as plausible as (AH2).

7. Conclusion

The challenge to (SPR) from Bálint's syndrome comes from a tempting perspective on RM's condition: that it is one in which he can see objects (the presence claim), but cannot see spatial location or space (the absence claim). But, I've argued, we need to distinguish the absence claim and the limitation claim—the latter of which doesn't make trouble for (SPR). The limitation claim is the claim that when RM sees an object he has *severely limited* visual perception of the object as located in space, and *severely limited* visual perception of space. I've argued that the empirical evidence about RM doesn't decide between these claims. Thus, the absence claim is not adequately supported and so the challenge to (SPR) can be resisted.

I don't take what I've argued here to present any kind of challenge to *experimental* work on Bálint's syndrome. Sometimes experimentalists working on Bálint's syndrome offer popular glosses, such as Robertson's characterization of RM's condition as one in which 'There is no

there there' (2004, p. 6). Now, given what I've argued, we should be cautious about such glosses if we read them as giving expression to the absence claim. And given what I've argued, I think it is fair to say that existing philosophical work on Bálint's syndrome is not as cautious as it might be in this respect. But of course that is *not* to call into question or dispute any of the data, methods, or aspects of the experimental work itself.

The issues I've raised, rather, concern difficulties with moving from the experimental work to something as philosophically significant as the falsity of (SPR). The evidence we have about Bálint's syndrome doesn't yet secure that negative result.

References

Andersen, R. A. *et al.* 2014: Optic ataxia: from Balint's syndrome to the parietal reach region. *Neuron* 81.5, 967—83.

Bálint, R. 1909: Seelenlähmung des "Schauens", optische Ataxie, rümliche Störung der Aufmerksamkeit. *European Neurology*, 25.1, 51—66.

Bálint, R. and Harvey, M. 1995: Psychic paralysis of gaze, optic ataxia, and spatial disorder of attention. *Cognitive Neuropsychology,* 12.3, 265—81.

Baylis, G.C. and Baylis, L.L. 2001: Visually misguided reaching in Balint's syndrome. *Neuropsychologia*, 39.8, 865—75.

Bayne, T. and Spence, C. 2015: Multisensory Perception. In M. Matthen (ed.), *The Oxford Handbook of Philosophy of Perception*. Oxford: Oxford University

Campbell, J. 2007: What's the role of spatial awareness in visual perception of objects. *Mind & Language*, 22.5, 548—62.

Campbell, J. 2012: Is Spatial Awareness Required for Object Perception? In R Baiasu *et al.* (eds.), *Contemporary Kantian Metaphysics: New Essays on Space and Time*. London: Palgrave Macmillan.

Cassam, Q. 2005: Space and Objective Experience. In J.L. Bermudez (ed.), *Thought, Reference, and Experience: Themes From the Philosophy of Gareth Evans*. Oxford: Clarendon Press.

Cassam, Q. 2007: *The Possibility of Knowledge*. Oxford: Oxford University Press.

Chechlacz, M. and Humphreys, G.W. 2014: The Enigma of Balint's Syndrome: Neural Substrates and Cognitive Deficits. *Frontiers in Human Neuroscience*, 8.123.

Coslett, H. B. and Saffran, E. 1991: Simultanagnosia. To see but not two see. *Brain*, 114 (Pt 4), 1523—45.

French, C. Forthcoming: Object Seeing and Spatial Perception. In F. Dorsch *et al.* (eds.), *Phenomenal Presence*. Oxford: Oxford University Press.

Friedman-Hill, S. *et al.* 2003: Posterior parietal cortex and the filtering of distractors. *Proceedings of the National Academy of Sciences of the United States of America,* 100.7, 4263—68.

Friedman-Hill, S, and Robertson, L. and Treisman, A. 1995: Parietal contributions to visual feature binding: evidence from a patient with bilateral lesions. *Science,* 269.5225, 853—55.

Gillen, J. A. and Dutton, G. N. 2003: Balint's syndrome in a 10-year-old male. *Developmental Medicine and Child Neurology*, 45.5, 349—52.

Harvey, M. and Milner, D. 1995: Bálint's patient. *Cognitive Neuropsychology,* 12.3, 261—64.

Holmes, G. 1918: Disturbances of Visual Orientation. *The British Journal of Ophthalmology* 2.9, 448—68.

Holmes, G. and Horrax, G. 1919: Disturbances of spatial orientation and visual attention, with loss of stereoscopic vision. *Archives of Neurology & Psychiatry*, 1.4, 385—407.

Humphreys, G.W. *et al.* 2000: Fractionating the binding process: neuropsychological evidence distinguishing binding of form from binding of surface features. *Vision Research,* 40.10-12, 1569—96.

Husserl, E. 1997: *Thing and Space: Lectures of 1907*. Edited by R. Rojcewicz. Dordrecht: Kluwer.

Kant, I. 1781/1787: *Critique of Pure Reason*. Translated and edited by P. Guyer and A.W. Wood. Cambridge: Cambridge University Press.

Kim, M. and Robertson, L. 2001: Implicit representations of space after bilateral parietal lobe damage. *Journal of Cognitive Neuroscience*, 13.8, 1080—87.

Luria, A.R. 1959: Disorders of "simultaneous perception" in a case of bilateral occipitoparietal brain injury. *Brain*, 82, 437—49.

Mac Cumhaill, C. 2015: Perceiving Immaterial Paths. *Philosophy and Phenomenological Research,* 90.3, 687—715.

Macpherson, F. 2011: Cross-Modal Experiences. *Proceedings of the Aristotelian Society,* 111, 429—68.

Martin, M.G.F. 1992: Sight and Touch. T. Crane (ed.), *The Contents of Experience*. Cambridge: Cambridge University Press.

Martin, M.G.F. 1993: Sense Modalities and Spatial Properties. In N. Eilan *et al.* (eds.), *Spatial Representation: Problems in Philosophy and Psychology*. Oxford: Oxford University Press.

Milner, D. and Goodale, M. 2006: *The Visual Brain in Action*. New York: Oxford University Press.

Rafal, R.D. 2001: Balint's syndrome. In M. Behrmann (ed.), *Handbook of Neuropsychology: Disorders of Visual Behavior*. 2nd edn. Vol. 4. Amsterdam: Elsevier.

Richardson, L. 2010: Seeing Empty Space. *European Journal of Philosophy*, 18.2, 227—43.

Robertson, L. 1999: What can spatial deficits teach us about feature binding and spatial maps. *Visual Cognition*, 409—30.

Robertson, L. 2003: Binding, Spatial Attention and Perceptual Awareness. *Nature Reviews Neuroscience*, 4, 93—102.

Robertson, L. 2004: *Space, Objects, Minds and Brains*. Hove, East Sussex: Psychology Press.

Robertson, L. (2014). Balint's Syndrome and the Study of Attention. In K. Nobre and S Kastner (eds.), *The Oxford Handbook of Attention.* Oxford: Oxford University Press.

Robertson, L. and Treisman, A. 2006: Attending to space within and between objects: Implications from a patient with Balint's syndrome. *Cognitive Neuropsychology* 23.3, pp. 448—62.

Robertson, L. and Treisman, A. *et al.* 1997: The Interaction of Spatial and Object Pathways: Evidence from Balint's Syndrome. *The Journal of Cognitive Neuroscience*, 9.3, 295—317.

Schwenkler, J. 2012: Does Visual Spatial Awareness Require the Visual Awareness of Space? *Mind & Language,* 27.3, 308—29.

Soteriou, M. 2011: The Perception of Absence, Space, and Time. In J. Roessler *et al.* (eds.), *Perception, Causation, & Objectivity*. Oxford: Oxford University Press.

Soteriou, M. 2013: *The Mind's Construction: The Ontology of Mind and Mental Action*. Oxford: Oxford University Press.

Spence, C. 2011: Crossmodal Correspondences: A Tutorial Review. *Atten Percept Psychophys,* 73, 971—95.

Stazicker, J. 2011: Attention, Visual Consciousness and Indeterminacy. Mind & Language, 26.2, 156—84.

Warren, D. 1998: Kant and the Apriority of Space. *The Philosophical Review*, 107.2, 179—224.

Wittgenstein, L. 1975: *Philosophical Remarks*. Chicago: University of Chicago Press.

Wojciulik, E. and Kanwisher, N. 1998: Implicit but not Explicit Feature Binding in a Balint's Patient. *Visual Cognition*, 5.1-2, 157—81.

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