

Bálint's Syndrome and the Structure of Visual Experience^{*}

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September 23, 2015

1 Introduction

Ordinary visual perception of a spatial object involves visual awareness of some of the space the object occupies, and visual awareness of the object as located in space. But does visual perception of a spatial object *require* visual awareness of space and spatial location? Call the claim that it does the *spatial perception requirement* (SPR).

(SPR) is subject to serious empirical challenge. For on the face of it individuals with Bálint's Syndrome – a pathological spatial perception deficit to be described further below – are individuals who can see objects but who can't see space itself, and can't see objects as spatially located. If this is right, then in Bálint's Syndrome there is a wholesale failure of (SPR).

I will argue that both aspects of (SPR) are defensible even in the light of Bálint's Syndrome. And I will argue further that we have positive reason to suppose that individuals with Bálint's Syndrome can see the spaces occupied by the objects they see. But how, then, can we articulate the way in which the experiences of individuals with Bálint's Syndrome differ from ordinary visual experiences? I suggest that we can articulate this in terms of the structure of visual experience: the experiences of individuals with Bálint's Syndrome do not involve a visual field in the way that ordinary visual experiences do.

^{*}[Acknowledgements]

2 Object Seeing and Spatial Perception

Here I focus on *conscious* object seeing where such seeing is or involves visual experience of an object in which the object visually appears certain ways to a subject. By ‘object’ I mean spatial object. *Spatial* objects are 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.

(SPR) pertains to object seeing understood as such. It is made up of a space awareness requirement and a location awareness requirement:

Spatial Perception Requirement (SPR)

Seeing an object requires seeing some of the space occupied by the object, and seeing the object as spatially located.¹

Before looking to how (SPR) comes under pressure, let’s briefly note how it is true to the phenomenological character of the experiences involved in ordinary cases of visual perception. Consider the mundane experience I have looking out to an apple tree in the field. I see an apple on the tree. My visual experience involves a space which I am aware of, 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 shed in the distance, and so on.

Such *ordinary* cases of object seeing satisfy (SPR), but what about less ordinary cases? This brings us to Bálint’s Syndrome.²

3 The Challenge from Bálint’s Syndrome

Bálint’s Syndrome is a disorder in which individuals can see *objects* (though only one at a time), yet have deficient visual *spatial* awareness. More specifically, Bálint’s Syndrome is taken to be a disorder in which an individual can see an object even though they cannot see the space the object is in, and cannot see

¹There is instructive discussion of some such requirement in Schwenkler (2012). He calls it the ‘Apriority Thesis’ (p. 314). Schwenkler helpfully discusses how some version of this idea, and some forms of support for it, are to be found in Kant (1781/1787) – on which see also Warren (1998), and Cassam (2005, 2007) – Wittgenstein (1975), and Husserl (1997).

²See 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).

the object as spatially located. Thus, we seem to have a straightforward empirical counterexample to (SPR): if this characterization of Bálint's Syndrome is correct, then (SPR) is false in both its aspects.

I'll defend (SPR) from this challenge in (§4), but first let's get clear on what Bálint's Syndrome is (§3.1), on why it is thought to involve a lack of visual awareness of space and spatial location (§3.2), and why it is thought to involve the presence of visual awareness of objects (§3.3).

3.1 The Syndrome

Bálint's Syndrome is a spatial perceptual 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.

Here I'll discuss the syndrome by drawing on work by Lynn Robertson and others, and in particular, findings about RM, a patient with Bálint's Syndrome.³ To get a clearer idea of Bálint's Syndrome let's look to Robertson's description of its manifestation in RM:⁴

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. 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

³Robertson (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 Balint and Holmes, and Luria (1959), Coslett and Saffran (1991), Humphreys et al. (2000) and Gillen and Dutton (2003).

⁴RM's condition has been variable (see Robertson, Treisman, et al. (1997, p. 297)). I'm interested just in those reports of RM's abilities at their worst.

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 reports that RM also manifested optic apraxia (p. 158).⁵

3.2 Seeing Space and Spatial Location

Does RM lack visual awareness of space and spatial location? This would be an extreme visuospatial deficit. So let's call the claim that this is the way to understand RM's visuospatial deficit the *Extreme View*. This view is held not just by Robertson and colleagues, but philosophers too:

RM had... completely lost his ability explicitly to represent space (Robertson, Treisman, et al. (1997), p. 302).

The space "out there," whether the spatial relationship between one object and another or the spatial relationship between a part of you and the object you see, is no longer available. Somehow your brain is not computing those spaces. There is no there there (Robertson (2004, p. 6))... These patients perceive a single object... yet they have no idea where it is located. It is not mislocated. Instead it seems to have no position at all (p. 108)... During early testing of his [RM's] extrapersonal spatial abilities he often made statements like, "See, that's my problem. I can't see where it is."... objects that popped into his view were not mislocated per se. Rather, they simply had no location in his perceptual experience (pp. 158–159).

What appears to be missing is an external representation of space (Robertson and Treisman (2006, p. 449)).

R.M.... had no spatial awareness (Campbell (2007), pp. 549–550).

[RM has an] incapacity for visual spatial awareness in the strict sense, i.e. of such objects and their intrinsic spatial properties as positioned within a larger space... [RM's object perception is] achieved

⁵RM 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).

without representing space itself (Schwenkler (2012), p. 322)...
RM perceived shapes that did not appear to be in space at all (p. 325).

The Extreme View is partly supported by the symptoms RM presents such as those reported above, but also:

[RM] suffered severe spatial disorientation, however, and got lost easily anywhere except in his own home... 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. Optic ataxia was pronounced: 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)).⁶

But the Extreme View is also supported by RM's poor performance on basic spatial tasks in experimental conditions, which I'll describe now.

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)).

Localization Within a Frame

Similar results were found when RM was asked to judge the locations of words (which he could see and read) 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

⁶G. C. Baylis and L. L. Baylis (2001) confirm that RM's optic ataxia is owing to a disruption of visual awareness as opposed to an independent problem with his reaching control system.

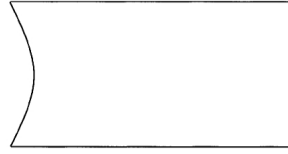


Figure 1: A shape with a curve used in trials with RM, from Robertson and Treisman (2006, p. 450)

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).

Within-object localization

RM also had problems with location awareness *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, as in (Fig. 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. 453–454).

In further sets of 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 (p. 456–457).

Does this evidence that RM fails to perceive the relative locations of the parts of objects conflict with the fact that he is reasonably good at identifying and discriminating certain figures (such as ON and NO) which are individuated only in terms of such spatial information? Given his deficits of visual spatial awareness, how is RM able to perform relatively well in such identification tasks?⁷

Robertson approaches these questions by suggesting, first, that there is an effect of word familiarity: ‘the more familiar the word was the more top-down in-

⁷The discussion here might also be framed in terms of orientation perception (where RM also has deficiencies), since NO/ON can be individuated in terms of orientation. I frame it simply in terms of part location for ease of discussion.

formation 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 seen 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 word *on*. Thus Robertson also 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.⁹

We've considered how RM can discriminate NO from ON given his within-object location problems. But why doesn't RM report where the N is relative to the O given that he can see the figure NO as such? 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. This is understandable, since if RM were asked to identify the word and

⁸This 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 discussion see Campbell (2007, p. 550ff) and Schwenkler (2012, pp. 323-325).

⁹Unfortunately, Robertson doesn't elaborate on how implicit spatial information together with stored information about words accounts for RM's relatively good performance in NO/ON identification tasks. But if the results regarding NO and ON prompt us to question the extent of RM's deficits of visuospatial awareness, we can look instead to the OZ and ZO case where similar visuospatial deficits align with exactly the identification deficits one would expect.

then localize its parts, and he were then *successful* on the localization task, it would be difficult to decide whether his success was down to a *visual* ability, or simply to an ability to *infer* the location of the letter based on information about which word was presented.

Presumably in a task where RM was asked to say where the N was, he struggled because of his simultanagnosia. When presented with NO, there are (at least) three potential perceptual units for RM: N, O, and NO. Because of simultanagnosia, RM could not perceive each of these as perceptual units in their own right at the same time. Thus if 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. Thus the fact that RM has simultanagnosia suggests that even if in a localization trial RM first identified NO as such, and then switched tasks to localize the N relative to the O, he would struggle to do this with *vision*. For in focusing not on the perceptual unit of NO, but instead on the N to get a visual sense of where it is relative to the O, he would see *just the N*.

Orientation

A further within-object deficit of spatial awareness 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)).

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

Objects such as letters, faces and other things with canonical orientations 'can be upright, inverted, tilted, mirror-imaged, and so on with respect to the

viewer' (Robertson, Treisman, et al. (1997), p. 300). At least some such viewer-relative information about how objects are oriented, Robertson and colleagues argue, is unavailable in RM's visual awareness.¹⁰

RM's poor performance in the simple spatial tasks described above 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). Rather, RM seems to have had problems with specifically *visuospatial* awareness.

And as we've seen the conclusions that Robertson and others want to draw is not that RM systematically *misperceived* space, location, and other spatial features. It is rather that the relevant spatial information is simply not consciously available to RM: he does not *see* things as located and positioned relative to other things, a frame, himself, and he does not *see* the relative locations of parts of objects.¹¹ The claim that there is a *lack* of space and spatial location awareness comes not merely from the experimental data, which demonstrate incredibly poor performance by RM in simple spatial tasks, but also (i) from the impression that RM was often guessing, given that he had to be prompted or coaxed to respond, and (ii) from RM's first person reports in which he indicates such a lack (e.g., 'he protested that he could not locate the word even though he could see it' (Robertson, Treisman, et al. (1997, p. 298))).

At this stage the following assumption should be flagged: we can make judgements about the *phenomenology* of RM's experience on the basis of the results of his performance in these experiments (broadly construed to include (i) and (ii)). Without this assumption it is difficult to see how we could take what we've just considered as support for the Extreme View of RM's visuospatial deficit. For that is the view that RM lacks awareness of space and spatial location; a view about how things are in RM's conscious perceptual life. This is

¹⁰See also Friedman-Hill, Robertson, Desimone, et al. (2003).

¹¹One might suggest, instead, that various egocentric and allocentric conscious representations of space are not *missing* in Bálint's Syndrome but rather that Bálint's Syndrome involves an integrative failure such that the various spatial representations cannot be integrated as they are in normal perception. (Many thanks to an anonymous referee for raising this.) Thus, RM might have an object-centric representation of space (on which see (§4)) which can't be integrated with egocentric and allocentric representations of space, even though RM also has these. Though this would go some way to explaining some of RM's visuospatial deficits, I think we can resist this understanding of what's happening in Bálint's Syndrome. It's not merely that RM doesn't have the capacity to place objects he sees in a space that includes them and other things (which could be explained by integrative failure). In RM's perceptual life, whichever object he sees at a given time takes over. He can see only one object at a time, he cannot see an *array*, nor can he see an object as *surrounded* by space. This can't be explained merely by integrative failure, and it suggests that we *shouldn't* attribute non-object-centric conscious spatial representations to RM.

an assumption I accept for the sake of argument, and will also take on in discussing further below the *ways* RM sees objects as being. The assumption can be questioned, but since it is presupposed in both the Challenge from Bálint's Syndrome and the perspective I will take on the Challenge, I discuss it no further.

3.3 Seeing Objects

We'll return to the Extreme View below. The Extreme View only falsifies (SPR) in conjunction with the claim that RM can see objects. This further claim is highly plausible. First, the idea that RM sees objects is presupposed in the very idea 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 awareness that usually accompany 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 awareness 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). 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 saw objects *as having certain colours* – thus, again, that he saw objects as things with certain properties. As Robertson (2004) writes

Since RM only saw one object at a time (simultanagnosia), 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.

4 Spatial Location, Space Occupation, and Space

We thus have in place the grounds for the Challenge from Bálint’s Syndrome to (SPR). The Extreme View seems to be correct, and so does the idea that RM can see objects. Thus (SPR) seems to be false in both its aspects. Contra this, I will argue that both aspects of (SPR) are defensible.

4.1 Location Awareness

The dominant interpretation of Bálint’s Syndrome is one on which subjects see objects yet *lack* visual awareness of location. I will now argue that relative to the empirical evidence we’ve considered, this is overstated. I will argue for this by presenting a coherent and empirically consistent perspective on Bálint’s Syndrome in which it doesn’t involve a *lack* of location awareness, but a *severely*

limited form of such awareness – purely object-centric location awareness (to be explained below). The claim is not that Bálint's Syndrome *does* involve such location awareness, but that since this is a coherent and empirically consistent possibility, the location requirement is not falsified by Bálint's Syndrome.

Robertson and others hold that in Bálint's Syndrome there is no there there. But presumably even RM has a sense of the objects he sees as *in the vicinity* or as *in the same space as he*. Isn't this a form of location awareness?¹² It seems to be, but I take it that Robertson would resist the idea that insofar as RM has such awareness it is *visual* awareness. Perhaps instead RM's awareness of objects as in the vicinity or in the same space as he would come from background knowledge of where seen objects tend to be, or non-visual perceptual engagement with the objects he sees. Whatever the positive story, those who take Robertson's line can insist that if RM has a sense of objects as in the vicinity or in the same space as he, it does not come from vision in the way that it might for those of us without Bálint's Syndrome. For the more ordinary visual route to such awareness is not available to RM, as it involves seeing objects as in a larger space, as related to oneself and other things.

RM cannot see objects as located relative to other things and spaces out there. But what about egocentric location awareness, seeing something as located relative to oneself – is that missing? Seeing something in relation to oneself doesn't always involve seeing an object *and seeing* oneself. So egocentric location awareness is not ruled out by simultanagnosia. But as we've seen, there is evidence which suggests egocentric location awareness deficiencies in RM. In orientation perception tasks, RM was unable to tell how objects were positioned in space relative to himself. RM could not judge the distances of objects relative to himself – he could not tell which of two objects was closer to him. And, he could not accurately reach towards objects in front of him (optic ataxia).

Perhaps, though, RM's egocentric location awareness is not *missing* but just severely *degraded*. One reason to hold this is that despite optic ataxia, RM would still reach to *the front*, not behind his head, above his head, etc, when asked to reach for objects actually in front of him. Why is this? One natural explanation is that he has a limited visual sense of the object as in front of him. The idea here is that the object is seen as in front of him in a relatively *unspecific* way. That is, it is seen as in front of him in a way that simply doesn't involve a specification of *where exactly* in front of him it is.

However, unspecific visual awareness of location is not the only way to explain the front directedness of RM's reaching for objects in front of him. Other

¹²Thanks to an anonymous referee for posing this question.

potential explanations include (a) multi-modal explanations. If attention is cued to the location of the object by auditory or some other means, then perhaps that is what determines the front directness of the reaching by somehow contributing a non-visual sense of where the object is to RM's overall experience of the object. (b) Memory explanations. 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 reach in front because of this remembered default.¹³ Finally, (c) implicit spatial ability explanations. As noted above RM has some implicit spatial abilities. So maybe this is what determines the directedness of his reaching, without the sense of the object as being in front of him (however unspecific) showing up at all in *awareness*. These options require further discussion, but they indicate how a proponent of the dominant interpretation might resist the idea that Bálint's Syndrome involves this limited form of egocentric location awareness.¹⁴

Despite the reasonable push back concerning unspecific egocentric location awareness, there is a good empirical case for the idea that egocentric and allocentric location awareness is missing in Bálint's Syndrome. Does that mean that Bálint's Syndrome involves a lack of visual awareness of location altogether? I'll now argue that it doesn't. For all we've seen about the condition, Bálint's Syndrome may involve *purely object-centric location awareness*.

¹³Lynn Robertson, in personal communication.

¹⁴Could RM see the surfaces of objects *as facing him*? (Thanks to an anonymous referee for raising this question.) I am not aware of any studies directly addressing this question, so I think we have to admit that it has the status of an open question. And drawing on what we do know about RM doesn't seem to settle it. On the one hand, RM would arguably struggle to see surfaces of objects as facing him in some of the ways that individuals without Bálint's Syndrome might see surfaces as facing. For instance, when I see a cube, and see its facing surface as facing, this is aided by a visually apparent contrast between facing and non-facing. But this is made possible by the fact that it is visually apparent to me that there is more of the cube to be seen than I see at a given moment. And *this* is made possible by such things as seeing it as a three-dimensional whole (depth perception), or seeing it rotate (motion perception). But in RM depth perception and motion perception are severely impaired (Robertson, Treisman, et al. (1997), p. 297, and p. 300 respectively). On the other hand, perhaps there are *other* ways in which a facing/non-facing contrast might become visually apparent, available even to RM. If so, there is another route to arguing that RM may have a limited form of location awareness. If, that is, we suppose that if he can see a surface as facing, he can see it as in front of him.

Purely Object-Centric Location Awareness

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 egocentric and allocentric location awareness. Objects are seen as in object-spaces, in relation to other objects and spaces, and in relation to oneself. The object-space itself figures as a visible place in larger space, itself seen. There can thus be allocentric and egocentric spatial awareness which involves the object-space and the object seen as in the object-space. But can an object be seen as there in its object-space when this is *completely disassociated* from the usual allocentric and egocentric accompaniments? Can there be a *purely object-centric* form of location awareness? (I take this as short for: purely object-centric visual awareness of an object as located.)

Consider a case where one sees an apple hanging on a tree. It is seen as part of a scene involving various objects and spaces (e.g., other apples, the grassy ground, the shed in the distance, the space between the tree and the shed), it is seen as in such-and-such a position relative to these other things. The apple is also seen as in such-and-such a position relative to oneself. So the apple is seen as *there*, and we can understand this very richly. That is, the apple is seen as there... (a) in an object-space which is (b) visibly part of a larger region of seen space, (c) at such-and-such a distance from the other apples on the tree, (d) in front of oneself, (e) to the left of the shed, (f) 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. We can conceive of this in terms of one's visual awareness transforming from a genuine case of complex scene perception to being more like what it is in simultanagnosia where just one thing is seen. So imagine that first the ground is no longer perceived. This is one bit of there-stripping, for one no longer sees the apple as above the ground. Then the shed goes. This is another bit of there-stripping as one no longer sees the apple as to the left of the shed. Then one loses a sense of the apple in relation to oneself. This is further there-stripping as one no longer sees the apple as in front of oneself. Then other things (apples, the sky, etc) go missing. This is yet more there-stripping as one no longer sees the apple as at such-and-such a distance from other things. Then suppose the sense of the space around the apple goes missing in that one no longer sees 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 appears as *there* in object-space. But what about in the final stage – where all that is left is the object? Can it be seen as *there*? Perhaps the visual sense of the object as *there* simply goes missing here. But an equally legitimate possibility seems to be one on which the subject still has visual awareness of the object as located, but in a severely limited or degraded form: purely object-centric location awareness.

How would such awareness be a limited or degraded form of location awareness? First, with just such awareness, our subject would not be able to report the location of the object in allocentric or egocentric terms (just as in Bálint's Syndrome). To the question of where the object is, our subject could give no more than the entirely trivial answer that it is there where it is. Our 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. (If asked by someone where to go to get to the object, with just purely object-centric visual awareness of location to go on, our subject would be at a loss as to how to answer). Second, and relatedly, our subject would not have a sense of the where the object is independently of awareness of the object itself. Even if our subject can see the object as in its object-space, this object-space would not be seen as a potential location for other objects, nor as a location in relation to other spaces and other objects. The subject would have no grip on the location of the object *independent* of the object they see. (This doesn't entail that the object-space doesn't somehow figure in their awareness, as where the object is. It's just that it would figure in awareness *only* insofar as the object does).

Purely object-centric visual awareness of location is thus quite unlike the visual location awareness involved in more ordinary visual experiences. It lacks allocentric and egocentric accompaniment and is not independent of object-awareness, and does not help the subject with spatial problems like coordinating, moving, directing, and so on. None of this suggests that such awareness wouldn't be a genuine form of location awareness, but just that it would be an extremely limited, useless, and unusual form of location awareness. The evidence we have about Bálint's Syndrome and how it involves visuospatial deficiencies doesn't rule out purely object-centric location awareness. As we've seen, the evidence indicates various egocentric and allocentric problems. But this is consistent with purely object-centric location awareness.

If we take the location awareness requirement to be that seeing an object requires seeing it as located in relation to oneself and/or spaces (it doesn't occupy) and things beyond one, then Bálint's Syndrome forces us to reject such a requirement (assuming we are also satisfied that there is not even unspecific location awareness in Bálint's Syndrome). But if all the requirement demands is that in seeing an object one sees it as located in some space, then Bálint's Syndrome

does not force us to reject such a requirement. For, as I've tried to suggest, a coherent and empirically consistent possibility is that Bálint's Syndrome involves purely object-centric visual awareness of an object as located: a severely limited form of location awareness. The location awareness aspect of (SPR) is thus defensible even in the light of Bálint's Syndrome.

Before continuing, I want to briefly offer further defence of the idea that involvement of purely object-centric location awareness in Bálint's Syndrome is empirically consistent. We can frame this with reference to RM. Could *RM* have purely object-centric location awareness? One worry about this concerns RM's within-object localization deficiencies. RM, it will be remembered, 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, 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.

There is a further objection to what I'm claiming here which will take us into considering the *space awareness requirement*. One might suggest that object-centric location awareness is possible only insofar as one can be aware of *object-spaces*. The suggestion is that one can see an object as in its object-space only if one can see the space where it is located. If this is right – and I won't question it – then we have grounds to suppose that Bálint's Syndrome lacks object-centric location awareness *given that* it is a condition in which *space* isn't seen.

I'll now argue that the empirical evidence about Bálint's Syndrome does not show that it is a condition in which space isn't seen. I'll argue further that we have positive reasons to suppose that space is seen even by individuals with Bálint's

Syndrome. Thus *both parts* of (SPR) are defensible.

4.2 Space Awareness

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 *the apple which determines it*. 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.

Could RM have such object-space awareness? If it is true that in Bálint's Syndrome what is 'missing is an explicit representation [perception] of external space' (Robertson and Treisman (2006, p. 449)) then RM is not capable of such space awareness. Now, RM doesn't have rich allocentric and egocentric spatial awareness in which object-spaces are seen as regions in a larger region of space, and seen as in such-and-such a relation to himself. But for all that, I want to suggest, he may still see an object-space when he sees an object. (I do not claim that RM can see an object-space devoid of an object, nor do I claim that RM can see the *whole of* an object-space.)

Empirical Consistency

Suppose we admit that in seeing an object, RM has such space awareness. Is this empirically consistent? Yes. Seeing an object in its object-space which one also sees¹⁵ is consistent with simultanagnosia. Seeing a larger space may well facilitate a broader view of a scene in which multiple objects can be seen at the same time, but merely seeing an object in its object-space which one also sees does not. And seeing an object in its object-space which one also sees does not imply localization abilities. For allocentric relative localization (within-object or otherwise), it looks like one needs a view of more than one thing as in a space in which things are visibly spatially related. But RM isn't capable of seeing things in this way, and admitting that he sees an object in its object-space which he also sees doesn't alter this. Similarly with localization within a frame. For this RM

¹⁵Note that this should be read as: seeing an object (which is in its object-space), and seeing its object-space, not: seeing an object *as located in* its object-space. For now the question is just whether the object-space is seen.

would need awareness of the space delineated by the frame, but he doesn't have that, and seeing the object-space of the object he sees does not give him that.

Furthermore, seeing the object-space of the object he sees will not improve RM's egocentric spatial awareness. If RM cannot see where the object is in relation to himself, cannot tell the distance the object from himself, and cannot accurately reach for the object, the same will be true for the object-space and anything else co-located with the object. Admitting that the object-space is seen doesn't make for any sort of improvement in RM's egocentric spatial abilities.

Moreover, seeing the object-space will not help RM to see objects as *positioned* within space, relative to a global frame of reference. Even if RM could see the object-space of a letter A which he sees, that would not help him to see the A as *upside down*. 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. The spatial structure the object-space is seen as having is fixed just by the spatial structure the object is seen as having.

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

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 (p. 325) that this means that RM cannot see an object-space:

if it were true that RM experience 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 take up by it.

But I think we need to distinguish various achievements here: being aware of an object-space is one thing, being aware of 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 clap his eyes on 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 brief discussion highlights is that the idea that RM is visually aware of object-spaces is not inconsistent with RM's visuospatial deficits. The deficits mean that his visual perception of such spaces is limited and impaired, as is his perception of objects. But they don't rule out the visual perception of such spaces. Given this, we can consistently describe RM's visual experiences similarly to how Bálint describes 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 even Robertson and colleagues 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)).

We lack empirical grounds to insist that individuals with Bálint's Syndrome lack visual awareness of space altogether. They seem to be capable of a limited form of space awareness: object-space awareness.

Positive Reasons

I will now argue that given some of the ways RM sees objects as being (understood as aspects of phenomenology), he sees object-spaces. For some of the ways he sees objects as being imply that the object is seen as occupying space, and thus

imply that in seeing the object some of the space it occupies is seen.¹⁶ The aspects of phenomenology I have in mind are: (a) seeing an object as coloured, (b) seeing an object as having multiple features, and (c) seeing an object as shaped and extended.

First, consider what it's like to see an object as having a certain colour. This has significant spatial aspects to it. There is an extension aspect, and a co-occupancy aspect. Take a wholly white plate placed on a dark worktop. Suppose one sees the surface of the plate as white. The colour one perceives in seeing the plate as coloured appears to *spread out across* the surface of the object, and it seems to be *constrained in its extent* by the boundaries of the plate (it doesn't seem to spread further than the plate onto the worktop). Or suppose one gets only a brief glimpse of an object in the distance (e.g., a blackbird high up in the sky), and it appears as a dot or a speck to one. If one still sees the object as coloured in some way, the colour will still appear extended to one. It's just that it will appear to occupy a tiny area, just enough for the object to be seen. Consider also the co-occupancy aspect to seeing an object as having a certain colour. When one sees the plate as white, the object and its colour appear as together, as occupying (some of) the same regions of space. This visible togetherness is part of what's involved in seeing the colour *inhere in* the object (or its surface). There are, thus, spatial aspects to the phenomenology of seeing an object *as* having a certain colour. And this is hard to make sense of if the object itself is not seen as occupying space.¹⁷

Second, consider what it's like to see an object as having *multiple* features as features of a single coherent thing. 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 is, again, 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, occupying

¹⁶The claim here is about seeing an object as *occupying* space, not one about seeing an object as *located in* space. If an object occupies space then it is located in space. But it doesn't follow that seeing an object as occupying space entails seeing it as located in space. Seeing as is not closed under entailment. I am not presupposing such location awareness in the case I am trying to make for the idea that there is space awareness in Bálint's Syndrome (though see fn. 18). If the point about space awareness is correct, then this blocks the obstacle to location awareness considered at the end of (§4.1). But still, the point about space awareness could be taken independently.

¹⁷The spatial aspects of colour perception are emphasized by Katz (1935). Note that my claim is that there are spatial aspects to seeing an object *as having* a certain colour. This is not necessarily a point about colour perception *per se*. It won't undermine the point if there is such a thing as seeing a colour without seeing an object *as* having a certain colour, where such colour perception doesn't have the spatial aspects highlighted.

(some of) the same region of object-space. And this is hard to make sense of if the object itself is not seen as occupying space. 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, one has a phenomenologically manifest sense of unity or togetherness which has an important spatial aspect to it. One has a sense of *spatial* togetherness: the features and the object are seen as in (some of) the same region of object-space.¹⁸

Finally, consider seeing an object as being shaped and extended in such-and-such a way. 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. In reality, for something to extend and take form *is* for it to extend and take form *in space*. Extension and shape are modes of space occupancy. But the order of appearances *here* reflects the order of being.¹⁹ Insofar as an object is *seen as* shaped and extended it is *seen as* extending and taking form *in space*. Another way to put this is that seeing something as being shaped and extended requires seeing it as taking form and extending in space and thus seeing it as *occupying space*. Seeing an object as shaped and extended – the appearance to one of an object as having such spatial modes – is seeing an object as occupying space. The presentation in experience of something as being shaped and extended in a certain way is the presentation of something as occupying space in a certain way, and thus involves the presentation to one of some of the space it occupies.

It is hard to make sense of seeing objects as being these spatial ways unless we admit that in seeing objects as being those ways one is also presented with *space*: the space is presented, and it shows up in experience as what *houses* the modes of space occupancy which appear to one.

I've argued that seeing an object as occupying space, and thus seeing object-space, is involved in (a) seeing an object as being coloured, (b) seeing an object as

¹⁸The spatial togetherness point seems to be a point about *co-location*. But if one can see features as co-located with an object, does that imply that one can see the object as located in the space where it and the features are? Not obviously. Compare: *all* I know about Jack and Jill is that they are co-located. There is a sense in which I still don't know where either of them is (beyond: they are in the same place). Perhaps there can be a visual analog of this. If so, I might be able to see features and an object as *co-located*, without thereby seeing the object as located in the space where it and the features are. If I am wrong, then this argument that individuals with Bálint's Syndrome see object-spaces cannot be used to reply to the concern about whether they have purely object-centric location awareness raised at the end of §4.1. But that doesn't mean that we can't deal with that concern, since there is an independent argument in the main text which is that insofar as individuals with Bálint's Syndrome see objects as shaped and extended, they see object-spaces.

¹⁹I emphasize *here* since as noted above sometimes the order of appearances does not reflect the order of being: being *F* might entail being *G* in certain cases where seeing an object as *F* doesn't entail seeing an object as *G*.

having multiple features, and most directly (c) seeing an object as being shaped and extended. To complete the argument that *RM* sees object-spaces we need only note that there is evidence that *RM* not only sees objects, but sees objects in these *ways*. But that is just what we encountered evidence of earlier (in §3.3) when we considered whether *RM* saw objects at all.

Thus, not only do we lack empirical grounds to suppose that individuals with Bálint's Syndrome don't see object-spaces, from what we know about the ways they see objects, and what I've argued about those ways of seeing objects, we have positive grounds to suppose that such individuals *do* see object-spaces. Therefore, the space awareness aspect of (SPR) is defensible.

We are now in a position to overcome the obstacle raised to purely object-centric location awareness in the last section. There we considered the idea that there cannot be visual awareness of an object as there in its object-space unless there is also awareness of the object-space itself. The thought was that even if the presence of purely object-centric location awareness is consistent with various ways in which Bálint's Syndrome involves deficiencies of location awareness, it still can't be present in Bálint's Syndrome, since that condition is one in which *space* awareness is lacking. But I've argued that visual awareness of space is not lacking in individuals with Bálint's Syndrome. Thus (SPR) is defensible in *both* its aspects even in the light of Bálint's Syndrome.²⁰

5 The Structure of Visual Experience

I've argued that (SPR) is defensible in the light of Bálint's Syndrome. It is coherent and empirically consistent to suppose that individuals such as *RM* can see objects as located. It is just that such location perception is severely limited:

²⁰I've been considering whether (SPR) fails by being subject to a simple empirical counterexample. However, one might develop a different argument against (SPR), on the basis of an empirically informed thought experiment. We might grant that actual Bálint's Syndrome does involve seeing objects with limited visual awareness of space and spatial location. But perhaps it's possible for there to be "Super" Bálint's Syndrome, where objects are seen *without* even limited visual awareness of space and spatial location. Perhaps. But what would show that this is even possible? That is not clear. And in any case, if such an argument could be developed, though it may have some success in challenging the location awareness requirement, the space awareness requirement would be more difficult to challenge. For if what I've argued is correct, then if awareness of the object-space is lost, the object cannot be seen as having features such as colour, and it can't be seen as having shape and extension. But then we lose our grip on the idea that the object is still *consciously seen*, since for an object to be consciously seen it must appear some ways to one, and it is hard to see how an object could appear any way to one without appearing to one as coloured or shaped or extended. (I mean this as a disjunctive condition, and one which may be satisfied even if the perception of the object as having any such feature is highly unspecific.)

purely object-centric. And we have positive reason to suppose that individuals such as RM see object-spaces. But individuals with Bálint's Syndrome clearly have severe problems of visuospatial awareness which make their experiences of objects quite different to ordinary visual experiences. How can we capture this if not in terms of a *failure* of (SPR)? One way to capture it instead is in terms of the structure of visual experience. Ordinary visual experience involves a visual field which gives it a certain structure. I'll end by suggesting that the experiences of individuals with Bálint's Syndrome lack a visual field.

In one sense of 'visual field' we might say that the experiences of individuals with Bálint's Syndrome involve a visual field. For since they involve *object-space*, they involve a limited object-sized visual field. But it is not this conception of the visual field that I have in mind when I claim that the experiences of individuals with Bálint's Syndrome lack a visual field. Rather, I have in mind the conception introduced in Martin (1992, 1993) and developed in Richardson (2010) and Soteriou (2011, 2013).²¹ Two aspects of this conception are relevant to my purposes here. Suppose one has an ordinary visual experience of an object...

- (a) The visual field delimits a cone of physical space which one sees, and in which the object one sees is seen as located and as spatially related to other things including subregions of the space one sees (Martin 1992, pp. 198–199; Martin 1993, p. 214).
- (b) The visual field imposes a limit on what one is visually receptive to at a time (Martin 1993, p. 214), but one that doesn't come from any object or space one is presented with, but rather one's own sensory limitations (Richardson 2010, pp. 233–240, Soteriou 2013, pp. 115–123).

Consider again the mundane experience I have when I see an apple on a tree, looking out into a field. My visual experience involves a large cone of space which I am aware of, in which I see the apple as located and as spatially related to other things including subregions of the cone of space I am aware of. If I reflect upon my visual experience, it seems to involve limitations: it seems as if I can only see so much, and that there is more to be seen beyond what I can now see. This can be specified in spatial terms, in terms of the boundaries of the space delimited by the visual field: I can be aware only of what falls within a space of such-and-such a size and shape. I have a sense that some way over to the left, for example, at the limit of the cone delineated by the visual field, there is a boundary I cannot now see beyond. But I have a sense of there being more, waiting to be seen if only I alter my point of view.

²¹For discussion, see Cumhaill (2015). On different notions of the visual field see Clark (1996).

This limitation is manifest in the phenomenology of my experience, but, as Soteriou (2013) emphasizes, it doesn't seem to come from any aspect of the world, any object or space I am presented with (pp. 118-119). It is not as if my experience has this limitation – is now confined to a region of space of such-and-such a size and extent – because of anything I now clap my eyes upon. I see the field with the apple tree, the shed, and so on. But this *scene*, or the presentation of it in experience, doesn't set the limitation. In seeing the scene I am visually aware of a cone of physical space in which the objects and spaces that make up the scene are situated. But the *chunk of physical space*, or the presentation of it in experience, doesn't set the limitation. *Regardless* of being presented with this scene and this chunk of space, my awareness would still be limited in the same way, confined to a region of space of such-and-such a size and extent.

Rather, as Richardson (2010) puts it 'in vision having this feature, it seems to me as if *I*, am limited, sensorily' (p. 239). The limitation to my experience is a manifestation of my own sensory limitations. This comes out in how a change in the limitation will strike me as a change in my own sensory limitations, and not as a change in any object or space in the world (as presented in experience). Suppose I gradually, but detectably, come to have a narrower field of view. The way in which my experience is limited thus changes: it becomes *more* limited. Before the change, the limitation was to a region of space of such-and-such a size, but now it is to a region of space of a smaller size. In reflecting upon this *change* in the way in which my experience is limited, it strikes me as a change in *my sensory limitations*, not as change in the (presented) world, as the shrinking of some object or space.²²

We have grounds to suppose that the experiences of individuals with Bálint's Syndrome are not at all like this, they lack a visual field. In seeing an object the space RM sees is at most the relevant object-space, *not* a cone of physical space in which he can locate the object, and see it as spatially related to other things and spaces. Thus the experiences RM is capable of having differ from typical visual experiences which involve a visual field. And suppose RM sees an apple. RM sees the apple and the apple-space. RM can be aware only of what falls within the apple-space he sees. But this limitation is set by the *apple* he sees, and *its* spatial structure. If RM goes from being aware of the apple, to being aware of, say, a church, or a banana, the way in which his experience is limited will change accordingly. The spatial specification of the limitation will now be set by the spatial structure of the church or the banana. This is quite unlike how

²²There *is* a change in what is presented to me: I now see less space. But the change in my experience's limitations doesn't seem to *amount to* a change in what is presented. The change in what is presented seems to *result from* the change in my sensory limitations.

things are in experiences which involve a visual field. It is not that the limits imposed by the visual field can't change, but that such changes, if they do occur, are not set by changes in *objects* one is aware of, but by one's sensory limitations. The spatial structure of RM's experience, in contrast, is beholden to whichever object he happens to be aware of.

RM's experiences of objects are not *lacking* in spatial structure. They involve awareness of the spatial structure of objects and object-spaces, and perhaps even awareness of objects as located. But for all that, his experiences have a radically different structure to those involved in ordinary visual experience. RM's sensory limitations do not delimit a region of space in which anything that is now seen must be situated, perceived objects do. In being object-centric in this way, RM's visual experiences lack a visual field.

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