

Beyond Adverbialism: A New Non-Relational Theory of Perceptual Experience

Abstract

Non-relational views of perceptual experience are currently enjoying a resurgence of popularity, largely due to their ability to account for illusions and hallucinations without relying on non-physical entities. Contemporary non-relational views are modelled on adverbialism. They therefore face an objection originally made by Frank Jackson which is almost universally regarded as constituting a refutation of the view. I argue that Jackson's well-known 'many-property problem', and the existing responses to it, have focused too closely on the controversial terminology adverbialists introduced to reflect the underlying nature of perceptual experience. Although Jackson's aim was to refute the adverbialist's metaphysical analysis of perceptual experience, he does this indirectly, by targeting his objection directly onto the terminology. I argue that we can also direct Jackson's many-property problem explicitly onto the adverbialist's metaphysics, generating a new challenge. The responses contemporary adverbialists and non-relationalists have made to the original objection do not yield successful responses to this challenge. We need a new non-relational account. I sketch an outline of a new theory, and motivate the view by explaining how it can respond successfully to this additional challenge.

KEYWORDS: Adverbialism, Non-Relational, Perception, Perceptual Experience, Binding Problem, Many-Property Problem

1. INTRODUCTION

Adverbialist views of perceptual experience have one particularly attractive feature: they are able to give a unified account of all perceptual experiences without positing relations to any kind of non-physical entity.¹ Indeed, adverbialism was first developed as a reaction to the ontological extravagance of the sense-data theory. Both theories consider illusions and hallucinations to be kinds of perceptual experience. However, the sense-data theorist takes the apparent relationality of ordinary, illusory and hallucinatory experiences at face value and claims that all these experiences consist in relations to sense-data. Adverbialists take the opposite route: the relational phenomenology of perceptual experience is misleading, and none of these experiences are genuinely relational. A perceptual experience of a red square may seem to consist in one's standing in a two-place relation to a red square, but in fact, the mind-independent object is only the cause of the experience (at least in the good case). Visually experiencing a red square is really a matter of having an experience which has certain properties or has been modified in a certain way.² Of course, the real advantage of the adverbialist's analysis of perceptual experience lies in its capacity to deal with hallucinatory cases; experiences which seem to involve a particular object when no such object is present in the local environment. Since having a perceptual experience is a matter of perceiving a certain way (rather than standing in a relation to something), adverbialists can

¹ For the purposes of this paper I will simply be assuming that a unified (or 'common fundamental kind') view of perceptual experience is desirable.

² Jackson's objection to adverbialism uses an example from the visual modality. Since his objection provides the focal point for this paper, the discussion here also centres on vision.

easily accommodate hallucinations without having to introduce any metaphysically suspicious entities.³

Given the popularity of physicalism within contemporary philosophy of mind, we might expect adverbialism to be a widely-endorsed position. As it turns out, adverbialism has been a minority view ever since it was first introduced. (Ducasse 1942, Chisholm 1957). Its unpopularity is partly explained by the difficulty adverbialists have with accounting for the apparent relationality of our perceptual experiences. (Crane 2006) However, the principal reason for the widespread rejection of adverbialism stems from a simple, and extremely influential objection formulated by Frank Jackson. The ‘many-property’ objection charges the adverbialist with failing to differentiate perceptual experiences which are obviously distinct whilst preserving certain important entailment relations. (Jackson 1977) However, despite the influence of this objection, a number of contemporary philosophers have recognised the benefits enjoyed by non-relational views like adverbialism, and have embarked upon a non-relationalist restoration project. (D’Ambrosio 2019, Kriegel 2007, 2008, 2011, Mendelovici 2018, Papineau 2014, 2021, Nida-Rümelin 2011)

Even though adverbialism’s early proponents put forward an alternative terminology we can use to talk about perception, adverbialism is first and foremost a theory about the metaphysics of perceptual experience. My first aim, in section two of this paper, is to argue that the adverbialism

³ For physicalist philosophers, the appeal of adverbialism has been increased by recent arguments that representationalism, which used to be the position of choice for physicalist philosophers of mind, does not qualify as a genuinely physicalist view. These arguments focus on the fact that standard versions of representationalism posit essential relations to uninstantiated properties (some of which are never instantiated). See Kriegel 2011, Papineau 2014, 2021, Schellenberg 2011

debate has, from the very beginning, focused too closely on the adverbialist's distinctive terminology. As a result, the deep metaphysical issue that lies behind the many-property problem has never been brought to the foreground. The original many-property objection places the emphasis on the adverbialist's inability to capture certain important distinctions and entailments using their novel terminology. However, I will argue that we can generate a new challenge by directing Jackson's many-property problem specifically onto the adverbialist's metaphysics. Now it becomes the challenge of explaining (among other things) what the difference is *at the metaphysical level* between two experiences involving the same properties.

My aim in section three is to show that none of the existing views successfully responds to this new challenge. Although adverbialism is defended for its metaphysical benefits, the many-property objection itself has been approached at the linguistic level, with proposed solutions involving various, and often ingenious, modifications to the adverbialist's terminology. While these linguistic modifications are intended to entail corresponding modifications at the metaphysical level, as metaphysical proposals they are often under-developed, or seem ad hoc and unmotivated. I suspect the fact that the existing proposals are successful at solving the problem at the linguistic level has prevented us from recognising the need for a more fine-grained account of the metaphysical structure of perceptual experience, which is what is required to solve the new many-property problem.⁴

⁴ Not everyone assumes that the many-property objection only directly targets the adverbialist's terminology. Angela Mendelovici recognises that the many-property objection is not only a problem for the adverbialist's terminology, there is also the question of how an adverbialist, or non-relationist, can explain how two experiences involving the same properties can be distinguished on metaphysical grounds. However, her response, while very interesting (she argues that this is a problem for relationist views as well) doesn't involve a positive solution to the problem.

It seems to me that the reason existing versions of non-relationalism are unable to support plausible responses to this problem is because they are modelled on adverbialism and analyse perceptual experiences in terms of property instantiation – an experience, or act, or subject instantiating certain properties.⁵ What we need is a new form of non-relationalism. The non-relational view I promote in section four is based on the *part-whole* relationship – I call it The Parts View. I demonstrate how this new non-relational account is able to respond successfully to Jackson’s challenge when this is explicitly directed on the metaphysics of perceptual experience. It can also escape the charge of being ad hoc and theory-driven, since it is independently motivated by our leading empirical and neuroscientific research. Fortuitously, my response to this challenge also functions as an explanation of why perceptual experiences have their distinctively relational phenomenology. So, although I will not be discussing in much detail whether existing non-relational views can accommodate the apparent relationality of perceptual experience, it is a nice benefit of my view that it can.⁶

(Mendelovici 2018: 214-20) In more recent work she has suggested that we may be cognitively closed to understanding how the different aspects of experiences combine. (Mendelovici 2019a)

⁵ It does not matter, as far as the argument of this paper is concerned, whether the relevant properties are attributed to experiences themselves, acts of experiencing or (as on Nida-Rümelin’s 2011 view) subjects of experience.

⁶ Many theorists who hold non-relational accounts of perceptual experience are non-relationalists about intentionality in general. (Kriegel 2007, 2008, 2011, Mendelovici 2018, Nida-Rümelin 2011). This might seem to provide a way for contemporary non-relationalists to explain why perceptual experiences can have their markedly relational phenomenology even though they are non-relational states. We might think that the relational phenomenology is just part of what it is to have intentionality. However, there is something particularly distinctive about the kind of relationality perceptual experiences seem to have. One seems to be confronted with mind-independent objects during one’s perceptual experience in a way which does not characterise our experiences of thinking about mind-independent

2. ADVERBIALISM & THE MANY-PROPERTY OBJECTION

Although adverbialism is a view about the metaphysics of perceptual experience, it gets its name from the alternative terminology its early proponents developed to reflect the true, non-relational nature of perceptual experience. Our existing terminology encourages a relational conception of perceptual experience: “I see a red square” implies a relation between a perceiver and a red square. Now, adverbialism was developed at a time when linguistic and metaphysical issues were thought to be very closely intertwined. This favoured the sense-datum theory: our relational descriptions of hallucinations use terms which must designate mental objects (since they cannot designate physical objects), therefore, we are obliged to include such entities in our ontology. Working within this intellectual environment, it is understandable why adverbialists felt that the best way of motivating their non-relational account of the metaphysics of perceptual experience was to develop their unique terminology; if our relational descriptions of hallucinations oblige us to posit mental objects, then a non-relational terminology will eliminate the need for them. Indeed, Chisholm’s approach was to develop a way of talking about perception which is consistent with what we know about perception, and which doesn’t commit us to *entia non grata*. Adverbialists developed their unique terminology accordingly. ‘I see a red square’ thus became ‘I see redly and squarely’. This new terminology highlights the fact that seeing a red square is not essentially a matter of standing in a relation to a red square; instead, it is a matter of seeing in a certain way - ‘redly’ and ‘squarely’ refer to ways of experiencing.

objects. And there are some intentional states (like moods) which arguably do not even seem to be relational. Therefore, the idea that perceptual experiences are intentional does not, on its own, explain the apparent relationality of perceptual experience.

The idea that our use of language automatically commits us to a particular metaphysics is less influential today than it was when adverbialism was first developed. So although the adverbialist's distinctive terminology was an important motivation for the view at the time when it was developed, adverbialism is essentially a theory about the metaphysics of perceptual experience and we should assess it independently from its proposal regarding the language we use to talk about our experiences.⁷ In this section, I explain why the adverbialist debate has not been conducted in line with this policy, particularly when it comes to Jackson's much-discussed objection.

Jackson's many-property objection to adverbialism begins with the claim that there is an entailment relation between seeing a red square and seeing red. This is because having an experience of a red square involves having an experience of red. In order to preserve this entailment relation, the adverbialist has to describe a subject experiencing a red square as someone who is 'seeing redly and squarely'. The entailment holds because seeing redly and squarely is a conjunction of *seeing redly* and *seeing squarely*. However, it now becomes difficult for the adverbialist to differentiate between experiences which involve the same properties. We need to be able to distinguish an experience of a red square and a green circle (say) from an experience of a red circle and a green square. These two experiences are clearly different types of experience,

⁷ If we think that quantifying over entities commits us to their existence, then we will want to develop a way of talking about perceptual experiences as of unicorns (say) in a way which does not commit us to the existence of unicorns. (Of course, we don't have to think that the use of quantifiers has ontological import. See Crane 2013) However, there is a clear distinction to be made between a theory of perceptual experience and a theory of *how we talk about* perceptual experience, and it is also clear that the *primary* motivation behind the development of adverbialism was to provide a theory of the first kind.

yet they involve the same properties: *red, square, circle* and *green*. The adverbialist's terminology seems incapable of describing these two experiences in a way which recognises their obvious distinctness - both must be described as 'seeing redly and squarely and greenly and circley'.

The many-property problem has two potential targets at which it can be explicitly directed. The first direct target is the terminology. Here the objection is that the adverbialist's terminology doesn't have the resources to produce two different *descriptions* (one for describing a red square and green circle experience, the other for describing a red circle and green square experience) while preserving the entailment relation between, for example, experiencing a red square and experiencing red. The second direct target is the adverbialist's account of the metaphysics of perceptual experience. On this interpretation, the objection is that the adverbialist's analysis of perceptual experience doesn't have the resources to explain the difference at the metaphysical level between different experiences involving the same properties. In other words, adverbialists can't explain how there can be two different experiences involving all the same properties in the first place. (And of course, the solution to this problem will be constrained by the need to preserve the fact that a person experiencing a red square will be experiencing red.)

It is important to note that the direct target of Jackson's original objection was the terminology. It challenged the adverbialist to come up with two different descriptions of experiences involving the same properties while preserving the relevant entailment relations. It's true that Jackson's main aim was to refute the adverbialist's metaphysical theory, but he didn't try to do this by targeting the many-property objection *itself* onto the adverbialist's metaphysical account. So he didn't intend the many-property objection to be interpreted as the challenge of explaining how there can be two experiences involving the same properties on the adverbialist's non-relational metaphysics. Jackson's aim in his 1975 and 1977 was to defend a sense-datum

theory, and as we have seen, it was generally agreed by all sides of the debate at the time that our ordinary relational terminology favours this view. Since the adverbialist's method for motivating their view was to eliminate the need for postulating mental objects by producing a terminology which made no use of terms seemingly designating such entities, it is understandable that Jackson sought to show that the adverbialist's endeavour was unachievable, thus securing the sense-datum view in its privileged position. Jackson says that the aim of his 1975 paper is 'to show that the adverbial analysis of visual experience does not provide an adequate procedure for the elimination of the troublesome substantives.' (Jackson 1975: 128)⁸ In other words, Jackson uses the many-property objection to show that the adverbial terminology is inadequate, and does not, therefore, undermine the need to postulate sense-data.

The sense-datum theory is no longer a popular position in the philosophy of perception. Nor do we think that our relational terminology automatically commits us to positing mental objects to be the relata in hallucinatory cases. Adverbialism, and non-relationalism more generally, is now motivated by appeal to purely metaphysical considerations. For example, Uriah Kriegel argues that we must be non-relationalists about all intentional states if we want to be physicalists. (Kriegel 2011) It is therefore extremely interesting that contemporary proponents of adverbialism accept Jackson's challenge in the terms in which it is offered: it attacked the metaphysical view via the terminology, and contemporary adverbialists defend the metaphysical view by developing a successful terminology. In the next section I will consider the existing attempts to respond to the original many-property problem and argue that while they might be successful as linguistic proposals – they may permit a way of using the adverbialist's terminology to describe different

⁸ The aim of this paper is not historical and so this is only a brief overview of the state of play in the philosophy of perception in the 1950s to 1970s.

experiences involving the same properties while preserving the entailment relations – they do not provide a successful response to the new many-property challenge.

3. PROPOSED SOLUTIONS AND THEIR PROBLEMS

The many-property objection has always been interpreted as a challenge which specifically targets the adverbialist's terminology. In a recent paper, Alexander Dinges says: 'One commonly raised objection to adverbialism is the many-property problem, the problem of accounting for *sentences* that seem to ascribe more than one property to an afterimage (e.g. 'Jane has a blue and square afterimage').' (Dinges 2015: 232 my emphasis) Even though most theorists make it clear that their linguistic solutions to the many-property problem entail a corresponding metaphysics, the fact that we can target the many-property objection *itself* directly onto the metaphysical theory hasn't been properly recognised. This is significant since it turns out that successful responses to the objection at the terminological level, even when the terminological modifications are held to entail corresponding metaphysical modifications, are not successful responses at to the new problem which is generated by directing the many-property problem onto the metaphysics.

Consider Kriegel's response.⁹ He begins by suggesting that we describe the first experience as 'seeing red-squarely and green-circley' and the second as 'seeing red-circley and green-squarely'. (This is an option Jackson himself considers, and is prepared to accept as a response to the challenge of differentiating the two experiences.) However, if we do this, then we lose the

⁹ Since Kriegel endorses an adverbialist account of intentionality in general, his proposed solution is intended to apply to all intentional states, not just perceptual experiences. Similarly, although my focus is on perceptual experience, my argument against Kriegel applies to his account of all intentional states and is not limited to his account of perceptual experience.

entailment relation. This is because ‘red-squarely’ is an unstructured expression which does not have ‘red’ as a distinct syntactic part (just as ‘pineapple’ does not have ‘apple’ as a distinct syntactic part). Consequently, and for the same reason that seeing a pineapple does not entail seeing an apple, we cannot legitimately deduce from the fact that someone is seeing red-squarely that they are seeing redly. Kriegel proposes to solve the entailment problem by making an ingenious appeal to the determinate-determinable relation. This relation orders properties into a hierarchical structure. Colour properties provide a good illustration - for example, aquamarine, teal and cerulean are all determinates of the determinable blue, and red is the determinable of the determinates scarlet and crimson. Kriegel argues that seeing red-squarely is a determinate of the determinable seeing redly, therefore seeing-redly is entailed by seeing red-squarely. Kriegel thus claims to have solved both aspects of Jackson’s many-property challenge. (Kriegel 2011)

Note that Kriegel’s solution begins by formulating different *descriptions* for experiences which are different but involve the same properties: ‘seeing red-squarely and green-circley’ describes the first experience and ‘seeing red-circley and green-squarely’ describes the second. Nevertheless, it is clear that Kriegel intends his proposal to entail the corresponding metaphysics. As well as the property of seeing redly there is a new, distinct property – seeing red-squarely – which isn’t simply a conjunction of seeing redly and seeing squarely. By introducing these new properties, Kriegel is then able to solve the entailment problem by drawing upon the determinate/determinable relation. It also means that his account has the resources to respond to the many-property problem if we direct it specifically onto the metaphysics, even though this isn’t something Kriegel considers himself. However, when we do this a number of problems arise.

First, it is worth noting that these new properties are not given any independent motivation. Adding the relevant structure at the terminological level may allow different descriptions for

different experiences involving the same properties, but we need additional reasons for thinking that perceptual experiences are structured in this particular way at the metaphysical level. In other words, even though these new paraphrases seem to work perfectly well at solving the linguistic problem of producing different ways of describing experiences involving the same properties, the claim that there are genuine properties which correspond to the paraphrases is given no defence.

Second, if we apply the many-property objection specifically to the metaphysical picture that emerges from Kriegel's response, we see that it is inadequate as a way of explaining the metaphysical difference between two experiences which involve the same properties. Notice that on his analysis, the two experiences do *not* in fact involve the same properties. One involves the properties of seeing red-squarely and green-circley, the other involves the properties of seeing red-circley and green-squarely. Since seeing red-squarely is not a conjunction of seeing redly and seeing squarely, the two experiences don't share any properties at all. Initially this might seem like a benefit since the challenge is to differentiate the experiences at the metaphysical level, but Kriegel's proposal achieves too much. Just as we want to explain the difference between the two experiences, we also need to capture the fact that there is something the same about them. We need to capture the fact that if a person is experiencing a red square at t_1 which has turned into a red circle by t_2 (perhaps a computer generated image is causing their experience which morphs from a square into a circle) only their shape experience changes, their colour experience will remain the same. This isn't what happens on Kriegel's view. There is no overlap at all between the experiences at t_1 and t_2 (or, for that matter, any of the experiences that occur between t_1 and t_2 , while the square morphs into a circle). Seeing red-squarely is an entirely different property from seeing red-circley.

It is true that both are determinates of the determinable seeing redly on Kriegel's view, so there is a *relationship* between seeing red-squarely and seeing red-circley, but it's not the kind of relationship we need (at least, not according to the standard way of construing the determinate/determinable relation). We need to explain the fact that there is something the same about the two experiences, but seeing red-squarely will only be similar to seeing red-circley in the same way that scarlet is similar to crimson. Kriegel could adopt a view according to which determinates share the determinable as a part, so crimson and scarlet share *red* as a part, and seeing red-squarely and seeing red-circley share *seeing red* as a part. However, this is only a very temporary solution. Just as we want to capture the fact that there is something the same between red-square experiences and red-circle experiences, we also want to capture the fact that there is something the same between red-square experiences and blue-square experiences. Imagine watching a red square turn into a blue square. The colour experience will change but now the shape experience will stay the same. On Kriegel's account, seeing red-squarely is a determinate of the determinable seeing redly, and seeing blue-squarely is a determinate of the determinable seeing bluey, so seeing red-squarely and seeing blue-squarely aren't determinates of the same determinable at all. In which case, even if determinates share the determinable as a part, this won't explain the fact that there is something the same between these two experiences.¹⁰ The upshot is that while Kriegel provides an inventive solution to the original many-property objection when it is directed at the terminology, the solution is unsuccessful if we apply it to the metaphysical problem – the problem of explaining the difference between two experiences involving the same properties at the metaphysical level.¹¹

¹⁰ I would like to thank Sam Coleman for this point.

¹¹ Alex Grzankowski provides another problem for Kriegel's view. It is a fact about the determinate-determinable relation that an object can only instantiate a determinable by instantiating a determinate of that determinable. Since,

Michael Tye's structured predicate theory also works on the assumption that the many-property problem only *directly* targets the adverbialist's terminology. Tye explains the difference between experiences involving the same properties by introducing a non-conjunctive combinatory operator (which he calls 'coincidence' or 'Coin' for short). This functions to map (say) redly and circley onto a new, compound function: redly-coincidental with-circley. (Tye 1984) By explaining that this new function is employed when the subject's experience is caused by something red and circular, Tye also claims to have solved the entailment problem. My main objection to Tye's view is very simple: as a metaphysical proposal it simply isn't detailed enough, as it stands, to offer a solution to the new many-property problem. Tye intends his linguistic analysis to be understood as entailing a corresponding metaphysics, that is, he is offering regimentations which describe a metaphysical proposal. However, the details of this metaphysical proposal are not provided, and it isn't at all clear how the new terminology would be realized at the metaphysical level. We are told that the new compound function 'may be explained by saying that it is the function which is typically operative in cases of sensation involving normal perceivers as a result of those perceivers viewing, in standard circumstances, a real physical object which is both red and circular.' (Tye 1984: 218) However, specifying when a function is operative doesn't tell us anything about the metaphysical foundation of that function. At the linguistic level, the 'Coin' operator aims to preserve compositionality (which supports the entailment between seeing redly-coincidental with-circley and seeing redly), but it isn't clear what metaphysics is being offered to underpin this

for Kriegel, seeing-redly is a determinable, then one can only instantiate the property *seeing-redly* by instantiating a determinate of that determinable, which means that Kriegel must deny that one can just see-redly. But, as Grzankowski argues, surely we want to allow that it is possible to just see-redly. After all, this seems to be what happens during a Ganzfeld experience (when a particular colour encompasses the whole of one's visual field). (Grzankowski 2018)

feature. This is a significant shortcoming; as we've seen from our analysis of Kriegel's account, providing a metaphysics which is capable of explaining the metaphysical difference between two experiences involving the same properties is no easy task.

Besides the main problem of insufficient detail, it could be that Tye's view is open to the second objection I made to Kriegel's view above. (This would depend on how the linguistic proposal gets realized at the metaphysical level, and since we are not provided with the details, it is not possible to assess this any further.) However, it is certainly vulnerable to the first. Although Tye recognises that adverbialism is a theory about the metaphysics of perceptual experience and intends his semantic proposals to have metaphysical implications, these are given no independent motivation. Of course, Tye would need to describe the metaphysical proposal in more detail before providing independent support for it, but the failure to recognise that independent support would be required is noticeable nonetheless. In short, it is unclear whether Tye's theory could be developed in such a way that it would solve the many-property problem when this is interpreted as the challenge of accounting for the metaphysical difference between two experiences involving the same properties. As it stands, it is clear that it doesn't solve this problem.

Justin D'Ambrosio also considers the many-property problem to be a challenge for the adverbialist's linguistic proposal. His new solution to the many-property problem consists, therefore, of a semantic proposal; he argues that we should treat perceptual verbs as intensional transitive verbs (ITVs) and then goes on to develop an adverbial semantics for ITVs. However, D'Ambrosio is very clear that his semantic solution to the many-property problem is only truly successful if it 'yields...a plausible metaphysics of perception'. (D'Ambrosio 2019: 438) He explains his view of the metaphysics of perceptual experience thus: 'To adverbially perceive an F is to be the agent of an event with a certain property: it is to F-perceive, or to perceive F-ly.'

(D'Ambrosio 2019: 443) My worry with D'Ambrosio's proposal is that while he provides a detailed semantic solution to the many-property problem and a general account of the metaphysics of perceptual experience (see the quote above), we are not given a *detailed* analysis of the metaphysics of perceptual experience. Because the many-property problem doesn't itself get targeted onto the metaphysics, it is still unclear how perceptual experiences are structured at the metaphysical level in such a way that would allow us to distinguish two experiences involving the same properties. Very briefly, his semantic proposal is that we should analyse these sentences:

Mary senses a red square patch and a green circular patch.

Mary senses a red round patch and a green square patch.

in the following way:

$\exists e(\text{sensing}(e) \ \& \ \text{agent}(e, \text{Mary}) \ \& \ \text{Char}(e, \text{a red square patch and a green round patch}))$.

$\exists e(\text{sensing}(e) \ \& \ \text{agent}(e, \text{Mary}) \ \& \ \text{Char}(e, \text{a red round patch and a green square patch}))$.

'Char' stands for 'is characterized by' (and comes from Forbes' formal semantics of ITVs (Forbes 2006)).¹² So to say 'Mary senses a red square patch and a green circular patch' is to say that there is an event, which is a sensing event whose agent is Mary and 'red square patch and green round

¹² D'Ambrosio in fact supplies two forms of adverbialist semantics – one involving Forbes' idea of 'Characterization' and one involving semantic incorporation. (Forbes 2006) Since they are formally equivalent, and since Forbes' formal semantics of ITVs is well-known, D'Ambrosio presents his solution to the many-property problem using the first. I do the same when discussing his proposal.

patch' characterizes the event. However, explaining that the experiences can be characterized in these different ways does not tell us anything about their metaphysical structure, beyond the fact that they are non-relational. Yet it is not enough to know that the characterizations entail a general, non-relational metaphysics of perceptual experience, we need to know what fine-grained metaphysical structure supports these characterizations. Indeed, what is it about the structure of the experiences themselves which makes the characterizations appropriate? Until we know exactly how our non-relational perceptual experiences are structured, we will not be able to respond to the many-property problem when it's directed at the metaphysics. Therefore, as it stands, D'Ambrosio's metaphysical proposal isn't detailed enough to explain what differentiates the two experiences at the metaphysical level.

I've argued that existing solutions to the many-property objection have focused too closely on solving the problem at the terminological level. Although the terminological modifications are presented as regimentations which entail a metaphysics, the metaphysical proposals are either unclear, not detailed enough, they haven't been defended or motivated independently, or they simply do not provide a satisfactory explanation of how two experiences involving the same properties differ at the metaphysical level. I suspect that the shortcomings of the existing metaphysical proposals have gone unnoticed precisely because they are presented through paraphrases and regimentations which seem to be successful at solving the many-property problem when the explicit focus remains at the linguistic level. Their success with respect to the original many-property problem has prevented us from recognising their failure to solve the new problem.

One explanation for the difficulty adverbialists have with responding to the many-property problem when this is targeted specifically at the metaphysics, is their reliance on the idea of property instantiation. As our analysis of Kriegel's proposal has shown, it is very difficult to

generate the complex metaphysical structure which is required to explain how two experiences can differ even though they involve the same properties using only property instantiation. This is important because it means that non-relationalist accounts which have moved away from the adverbialist's terminology are still susceptible to the many-property problem so long as they persist in analysing perceptual experiences in terms of experiences, or acts of experiencing, instantiating various properties. In other words, non-relationalist accounts which operate with the same kind of metaphysical set-up as adverbialism will find it just as difficult to respond to the many-property problem when it is interpreted as the challenge of explaining how two experiences involving the same properties can nevertheless be different experiences. In demonstration of this point, let me conclude this section by considering an alternative non-relationalist approach to the problem.

Although she is keen to create some distance between her account and adverbialism, Martine Nida-Rümelin's analysis of the metaphysics of perceptual experience also relies on property instantiation. (Nida-Rümelin 2011: 380) However, whereas adverbialists attribute properties to experiences, acts of experiencing, or experiencing events, Nida-Rümelin attributes properties (phenomenal properties) to the subjects of the experience. (Nida-Rümelin 2011) She describes conscious experiences as having a subject-object structure; 'the structure of 'something' being given *to* a subject'. (2011: 355) However, it is important to note that on this view, the subject-object structure is purely phenomenological; metaphysically, we simply have a subject instantiating non-relational, phenomenal properties. Nevertheless, Nida-Rümelin uses the phenomenological structure of experience to carve out a notion of quasi-objects (we seem to be presented with objects in experience, even though experience is in fact non-relational), and the notion of quasi-reference to these quasi-objects. She claims that her account is distinct from and preferable to adverbialism because (1) adverbialism traditionally has denied the subject-object-

structure of experience just described, and (2) the idea of quasi-reference which is made available by acknowledging the subject-object structure of experiences provides a response to Jackson's challenge.

I want to take issue with both (1) and (2). First, although adverbialists deny that perceptual experience has a subject-object structure metaphysically speaking, they need not (and do not) deny that it *seems* to have such a structure. (It would surely be very implausible to deny that perceptual experience seems to be a relation to objects.) And of course, Nida-Rümelin's claim is only that perceptual experience has a subject-object structure phenomenologically. Metaphysically, perceptual experiences are non-relational – they are a matter of subjects instantiating phenomenal properties. There is therefore no significant disagreement between Nida-Rümelin and the adverbialist on this score. Consequently, if the subject-object phenomenology of perceptual experience delivers quasi-reference, and this provides a response to Jackson's challenge, then this response would also be available to the adverbialist.

However, the notion of quasi-reference fails to provide a response to the many-property problem. Ultimately, quasi-reference is a phenomenological notion. Our experiences seem to have a subject-object structure, and we seem to be able to refer to the objects to which we seem to be related. All of this accurately captures the phenomenology, but what we need is an explanation of how two experiences involving the same properties differ *metaphysically*. In other words, what facts about the experiences themselves explain their different phenomenologies? No-one will deny that an experience of a red square and a green circle differs phenomenally from an experience of a red circle and a green square, but what we need is an *explanation* of that difference. Stating that there is a phenomenal difference is merely to articulate the problem, it doesn't provide a solution to it. As it stands, Nida-Rümelin's account also fails to provide a successful response to the many-

property problem when it's directed specifically onto the metaphysics. I suggest that we consider an alternative kind of non-relational account - one that moves away from property instantiation altogether.

4. The Parts View

I have argued that adverbialism, and non-relational views which rely on the adverbialist's property instantiation model, are unable to respond successfully to the new many-property objection. Trying to bind properties together in a way that also preserves their distinctness has proven a considerable challenge. Kriegel succeeds in binding the relevant properties together, but fails to preserve their distinctness, and although Tye's and D'Ambrosio's semantic solutions seems to maintain compositionality, we are given no explanation of the precise, fine-grained metaphysics which underpins this structure. However, we should not regard the shortcomings of existing non-relational views as a reason to move away from non-relationalism about perceptual experience. After all, it is still true that non-relationalism provides an excellent way of meeting the criteria laid down by a genuinely physicalist metaphysics whilst accommodating all perceptual experiences (illusions and hallucinations included). Perhaps we simply need a new kind of non-relationalism. In this final section of the paper I will outline the form I think a successful non-relationalist view should take. I should point out that my aim here is just to lay the foundations for a successful view – further development is required before we have a comprehensive non-relational account of perceptual experience. Notwithstanding this proviso, I will try to motivate my new approach by showing how it can explain how two experiences involving the same properties can differ, in a way which doubles as an explanation for the apparent relationality of perceptual experience. While

further questions remain, the view I propose is best-placed to fit with the empirical research needed to provide the answers.

First, I recommend leaving behind adverbialist-style non-relationalism and adopting a new version: The Parts View.¹³ According to this view, the different aspects of the experience which characterise it as the kind of experience it is are not properties or modifications of the experience (or the perceiver, or the act of experiencing); they are different constitutive *parts* of the experience. We can begin with a very simple, illustrative example: a red square experience will be made up from ‘square experience’ and ‘red experience’.¹⁴ Similarities between different types of experience can be accounted for by the fact that different experiences featuring the same properties will share parts. So our red square experience will share a part with a red fire engine experience (assuming for the sake of the example that the same shade of red is experienced in both cases). The similarity between the red square experience and the red fire engine experience is not, therefore, to be explained by appealing to modifications or properties of experiences, as on adverbialism and existing non-relational views.

Now, much of this paper has been given over to criticising existing non-relational views for failing to justify at the metaphysical level their various responses to the challenge of differentiating experiences involving the same properties. So let me first describe how my view

¹³ I view my own approach as preserving non-relationalism whilst moving away from adverbialism since I’ve assumed that property instantiation is essential to or definitional of adverbialism, as well as being a feature of contemporary non-relationalist views.

¹⁴ I use expressions like ‘red square experience’ (instead of ‘experience of a red square’) as a reminder that this is a non-relational view, so our perceptual experiences are not essentially relations to mind-independent objects and properties, even though they are usually caused by mind-independent objects and properties.

speaks to this concern, and then offer some justification from empirical research for my analysis. This will also help us to move beyond the rudimentary example above towards a more detailed understanding of how the Parts View works.

One of the most significant benefits of non-relational views comes from their physicalist credentials, and my view is entirely compatible with a genuinely physicalist metaphysics. Each token perceptual experience is realized by a neural process, and this neural process is made up from smaller, functionally organised systems of neurons, each of which is responsible for a part of the overall experience.¹⁵ For example, there will be a neural process responsible for ‘red’ and another process responsible for ‘square’ and so on. Of course, these smaller systems can be composed of even smaller functionally organised systems – so the neural system responsible for ‘square’ involves neural processes for ‘straight-edge’ and so on. This proposal is entirely in-line with, and supported by, what we know about the fine-grained functional specificity of our neural architecture. (Gazzaniga *et al* 1998, Zeki 1993)

¹⁵ This brief introduction to my view should serve to distinguish it from another recent adverbialist proposal which draws upon mereology to answer the many-property problem. Kyle Banick recommends an analysis of experiences as events, but unlike D’Ambrosio (whose metaphysical analysis of perceptual experience also uses an event ontology) Banick analyses events in terms of a part-whole mereological structure. (Banick 2018) While I am very sympathetic to Banick’s approach, on my view, experiences should be thought of as objects (neural objects, if you like) rather than events. Although our everyday talk of experiences probably fits more comfortably with an event ontology, at the metaphysical level experiences are neural systems which are better classified as objects rather than events. For example, they occupy a particular spatial location at a time, and have determinate spatial boundaries. (This is true even if the neural system which realizes an experience is distributed over different brain regions.) In addition, since our neural architecture is part of us it moves with us, and, as Dretske pointed out, objects can move but events cannot. (Dretske 1967)

Indeed, one of the significant advantages of my view is that it takes its cue from empirical investigations into how configurations of neurons in the brain deliver perceptual experiences. The neuroanatomy of the visual system supports distinct pathways for processing different features; for example, we have discovered that small populations of neurons respond selectively to objects and faces (Sergent 1992, Bruce, Desimone and Gross 1981, Desimone, Albright, Gross and Bruce 1984, Tsao and Livingstone 2008), the orientation of edges (Hubel and Wiesel 1959, 1962), direction of movement (Hawken, Parker and Lund, 1988), colour (Landisman and Ts'O 2002, Friedman *et al* 2003, Xiao *et al* 2003, Lu and Roe 2008), and so on. Further support of this modularity is provided by the fact that localised brain damage results in very specific loss of functionality. For example, colour vision can be lost without subjects losing the ability to perceive shape or motion (Meadows 1974, Damasio *et al.* 1980).

Making the transition from the adverbialist's property instantiation model to the parts model might seem like a small move, but the rewards are significant. For instance, notice that perceptual experiences are structured on this new version of non-relationalism - they have a part-whole structure.¹⁶ The simple fact that perceptual experiences have an obvious structure delivers a response to one aspect of the many-property problem – namely, it explains the entailment relation between knowing that a subject is experiencing a red square and knowing that they are experiencing red. The explanation is very simple: experiencing red is simply a *part* of experiencing a red square. That is, the neural process that realizes a red square experience is composed of neural processes coding 'red' and neural processes coding 'square'. The entailment holds because a red

¹⁶ David Papineau also points out in his 2014 that perceptual experiences can be structured even on a non-relationalist framework. He mentions the possible advantages of utilising the part-whole relation but does not develop the idea any further.

square experience partly comprises red experience. Now let me explain the response my account can give to the other component of the new, metaphysics-directed many-property problem – the problem of explaining how we can have two different experiences involving the same properties. Although more work is needed before we have a comprehensive solution at the metaphysical level, my view can make progress on this question in a way that traditional adverbialism cannot.

A significant benefit of my non-relational account is that it is entirely in-line with leading contemporary empirical research in cognitive psychology and neuroscience. Recall our two experiences – the experience of the red square and green circle, and the experience of the red circle and the green square. These two experiences will involve the same neural processes; both comprise smaller functionally organised neural systems coding red, green, square and circle. Additional processes or mechanisms are required to bind the perceived properties in different ways. This general idea is supported by Anne Treisman’s well-known experiments on illusory conjunctions – situations where properties (such as shape and colour properties) are incorrectly bound together. (For example, a subject might experience a red letter ‘x’ and a green letter ‘o’ when presented with a red ‘o’ and a green ‘x’.) The phenomenon of illusory conjunctions is well-documented, and provides important support for the Parts View. After all, as Treisman points out, if different properties were not coded separately then it would not be possible for them to recombine incorrectly. (Treisman 1999)

Treisman’s own explanation for how properties get successfully combined appeals to the fact that we experience only one object to be at a particular region of space at any given time. Experiencing different properties (a shape property and a colour property for example) to be at the same location suffices to bind those properties together. In other words, we experience a red square and green circle because we experience the red and square to be at the same location as each other,

and the green and circle to be at the same location as each other.¹⁷ Treisman argues that it is the mechanism of attention which is responsible for binding features together by placing those features at locations. (Treisman 1999, 2003) There has been much debate about the role attention plays in perceptual binding. For example, it is unclear whether we should think of attention as prior to and responsible for binding, or whether attention is in fact the result of prior binding mechanisms. (For more on this issue see Goldsmith 1998, Lavie 1997)

Whatever we conclude about Treisman's theories about attention, it is important not to lose sight of the role spatial representation plays in explaining how the same features can get combined in different ways to yield different experiences.¹⁸ Studies support her central idea that binding occurs through experiencing different features (say, shape and colour) as being at the same location. Indeed, relating features to spatial locations is integral to the view that something like binding ('perceptual grouping') occurs even in early, preattentive vision. (Seymour *et al.* 2009, Gray 1999) We experience a red square because *red* and *square* are experienced as being at the same location. This theory is supported by the fact that if two different objects are presented as being at the same location (by presenting them to different eyes), the subject's experience will alternate between various binding possibilities with respect to the colour and shape of the objects. (Shevell *et al* 2008) The fact that presenting multiple instances of the same feature (such as colour)

¹⁷ My view doesn't require essential relations to actual, mind-independent locations. It just has to seem to our subject that red and square are experienced *as being* at the same location. Of course, since perceptual experience has a relational phenomenology, we take these locations to be mind-independent locations.

¹⁸ In the philosophy of perception, the term 'representation' is much more theoretically loaded than it is in the vision science literature; its use within philosophy may be construed as an endorsement of representationalism. My use of the term here is simply in-line with its usage within vision science and is not intended to imply further commitments.

in the same location can disrupt successful binding supports the contention that binding requires being perceived at a location. (Holcombe 2009) Of course, the fact that unsuccessful binding occurs through objects being perceived at the same location also supports this theory, since it provides evidence for the role location markers play in binding.

Research carried out with people suffering from Balint's syndrome has been particularly useful in establishing the relationship between binding and spatial representation. Balint's syndrome results from damage to both parietal lobes and is characterised by three impairments to visual perception: simultanagnosia (an inability to visually perceive more than one object at the same time), optic ataxia (an inability to reach accurately towards objects) and optic apraxia (a difficulty in voluntarily moving the fixation of gaze). As a result, the capacity for spatial representation is significantly reduced in subjects suffering from this condition, and studies have shown that the ability to bind properties to a single object is compromised through these subjects' impaired capacity for spatial representation. (Cinél and Humphreys 2006, Robertson 2005)¹⁹ It seems that spatial representation, more specifically, seeing objects or properties as being at locations, is required for successful binding.

Let's take stock. The new many-property problem asks us to explain the difference between two experiences involving the same properties in a way that preserves the important entailment relations. It proved extremely difficult to do this on the adverbialist's property instantiation model, but if we endorse the Parts View instead, we are well on the way to a solution. The Parts View can easily explain the entailment relation between experiencing a red square and experiencing red: red

¹⁹ See French 2018 for an argument that existing studies are not conclusive with respect to whether Balint's syndrome sufferers are able to see objects without seeing them as spatially located, or whether their capacity for spatial representation is simply limited.

square experience partly comprises red experience. This is because the neural process that realizes a red square experience is composed of neural processes realizing ‘red’ and neural processes realizing ‘square’. The Parts View can also explain how there can be different experiences involving the very same properties. Different properties get bound together by being experienced as being at the same location. So our experience of the red square and green circle differs from our experience of the red circle and the green square because, in the first, red and square are experienced as being at the same location and so are green and circle, whereas in the second, red and circle are experienced as being at the same location and so are green and square. This will mean that the neural process which realizes our experience of a red square at location A (say) will have neural parts corresponding to *red*, *square*, and *location A*.²⁰

Now, this explanation has a rather pleasing consequence, for not only does it explain how properties like red and square, and green and circle get bound together in experience, it also doubles as an explanation for the apparent relationality of our perceptual experiences. I have not addressed whether existing non-relationalist views have the means to respond to this challenge; this has not seemed necessary since I have argued that their inability to respond successfully to the new many-property objection provides a good enough reason to move away from them. However, it is a decided benefit of the Parts View that it does provide an explanation: experiencing features as being at particular locations involves experiencing oneself as standing in a two-place relation

²⁰ On my view, features are always experienced as located. I have defended this aspect of the view in other work. (Gow 2019)

to those features, and experiencing oneself to be standing in a two-place relation to features constitutes, and thereby accounts for, the relational phenomenology of perceptual experience.²¹

Note that this solution doesn't seem to be available to the adverbialist or standard non-relationalist. While we can make sense of the idea that *redly* is a modification of our experience – a way of perceiving, rather than something to which we stand in a two-place relation, this isn't going to work for locations. Part of the reason is that experiencing locations doesn't seem to involve any distinctive 'location' phenomenology. There is something it is like to have red experience, and something it is like to have square experience, and this helps us to think of redly and squarely as being ways of experiencing, but it's difficult to pin down a *what it is like*-ness for experiencing locations. It is therefore much harder to think of locations in terms of ways of perceiving. The main reason why it would be difficult for the adverbialist to appeal to locations to explain how properties like red and circle get bound together is that we experience locations as being particulars not properties.²² Adverbialism works by analysing (what we take to be) properties of mind-independent objects in terms of properties or modifications of experiences. Experiencing red is experiencing in a certain way – redly. This makes sense when we're talking about properties, but it won't work for things that seem to be particulars, and locations seem to be particulars. Now, I don't want to claim definitively that the adverbialist cannot make use of the solution outlined above. However, the burden of proof is placed on them to explain, first, how this idea could be

²¹ In my 2019 I have argued that all perceptual experience has a relational phenomenology – even those cases which have been cited as counter-examples to this claim, such as blurry experience and after-images.

²² I am not claiming that locations *are* particulars or that particulars enter our experience in any way. My claim is that we experience locations *as being* particulars, whereas we experience red and square as being properties.

made to work on their view, and second, why the resulting view would be preferable to the Parts View.

We have made some significant progress. We now have an explanation of how two experiences involving the same properties can be different experiences, and we have explained why seeing a red square entails seeing red. However, the solution to the problem of explaining how experiences involving the same properties can be different experiences gives rise to a further question: how does location information get bound with the relevant properties? We've explained the difference between an experience of a red circle and a green square and an experience of a red square and a green circle by saying that red, circle, green, and square get bound in the correct ways by being experienced as being at particular locations. A complete solution requires an explanation of how features *and locations* get bound together in the required way.

The short answer is that we don't yet know how the visual system achieves this binding of features to locations.²³ And since this appears to be an empirical question, it's not something I can resolve in the present paper. However, the Parts View is in a much better position than adverbialism when it comes to the search for a solution to this final stage of the problem. On my view, just as a certain neural system will be responsible for red and another for square, yet another will be responsible for the location. Again, this idea seems to be entirely in-line with the leading empirical research. (Mishkin *et al.* 1983). On my view, our experience of a red circle at location A is composed of neural systems which individually realize red, circle, and location A. The fact that locations are experienced as particulars not properties is no problem for the Parts View –

²³ I am intrigued by the temporal correlation hypothesis, according to which properties and locations are bound through the selective synchronization of the distributed neural systems which realize them. (Gray 1999)

neural systems can realize experiences of particulars just as easily as experiences of properties. As I've already explained, locations present a problem for adverbialism since the view seems only able to accommodate properties. The upshot is that although we don't yet have a complete theory, the Parts View can respond to our initial problem of explaining how experiences involving the same properties can qualify as different experiences, and it promises to be compatible with the answer to the final question which remains.

5. CONCLUSION

I have argued that the debate over the many-property problem has focused too closely on the adverbialist's terminology, often leaving the important question of whether adverbialism provides a plausible metaphysics of perceptual experience in the background. I pointed out that there are two ways of interpreting the many-property objection. According to the first, the objection is that the adverbialist's terminology doesn't have the resources to produce two different *descriptions* of different experiences involving the same properties while preserving the relevant entailment relations. According to the second interpretation, the objection is that the adverbialist's metaphysical analysis of perceptual experience doesn't have the resources to explain how experiences involving the same properties can nevertheless be different experiences (while preserving the entailment relations). Even though adverbialism is primarily a theory about the metaphysics of perceptual experience, the many-property problem has almost always been interpreted the first way. However, because contemporary defenders of adverbialism intend their linguistic solutions to the many-property objection to entail a corresponding metaphysics, it is possible to assess whether these views can also provide a solution to the new interpretation of the problem. I have argued that the existing proposals fail. Either the metaphysical picture isn't clear,

it isn't detailed enough, it hasn't been defended or motivated independently or it simply doesn't work.

In the final part of the paper I gave an overview of the kind of non-relational account we should be developing. There are, of course, many details that need filling in and questions which will need to be answered. For example, in recent work, Mendelovici has argued that complex states are not reducible to their parts (Mendelovici 2019b), whereas my view rules out holism - the idea that an experience could be more than the sum of its parts. Nevertheless, I hope that I've said enough to show that the Parts View is a more than viable contender. After all, analysing perceptual experiences in terms of the part-whole relationship has generated a non-relational account of perceptual experience which is capable of responding to the new, metaphysics-directed many-property problem (although not, admittedly, solving it in its entirety). What is more, this new non-relational view is compatible with empirical research into how experiences are realized in the brain. On my view, a perceptual experience is a neural process which is composed of parts – smaller functionally organised systems of neurons, each responsible for a different aspect of the experience. I have appealed to findings in cognitive psychology and neuroscience to explain how this view can explain how we can have two different experiences involving the same properties. Features are experienced as being at particular locations, and it is their co-location which binds them together. Although empirical questions remain regarding how locations get bound to features, it is fortuitous that the preliminary solution doubles as an explanation of why perceptual experiences have their characteristic relational phenomenology – experiencing properties as being

at a particular location simply is to experience oneself as standing in a two-place relation to objects and properties in one's local environment.²⁴

References

- Banick, K. 2018. 'How to be an Adverbialist about Phenomenal Intentionality' *Synthese*
<https://doi.org/10.1007/s11229-018-02053-0>
- Bealer, G. 1982 *Quality and Concept* Clarendon Press
- Bengson, J., Grube, E., Korman, D. 2011. 'A New Framework for Conceptualism' *Noûs* 45:1 167-189
- Bruce, C; Desimone, R and Gross, C. G. 1981. 'Visual properties of neurons in a polysensory area in superior temporal sulcus of the macaque' *Journal of Neurophysiology* 46(2): 369-384.
- Byrne, A. 2005. 'Perception and Conceptual Content' in *Contemporary Debates in Epistemology* (eds.) M. Steup & E. Sosa. Oxford: Blackwell pp 231-250
- Chisholm, R. 1957. *Perceiving: A Philosophical Study*. Cornell University Press
- Churchland, P. 2007. *Neurophilosophy at Work* New York: Cambridge University Press
- Cinel, C. & Humphreys, G. W. 2006. 'On the relations between implicit and explicit spatial binding: Evidence from Balint's syndrome' *Cognitive Affective and Behavioral Neuroscience* 6 2: 127-40

²⁴ I have presented the ideas in this paper at a number of conferences and workshops, and would like to thank the participants for their helpful comments. I am particularly indebted to Tim Crane, Justin D'Ambrosio, Alex Grzankowski, Uriah Kriegel, Angela Mendelovici and David Papineau. I would also like to thank two anonymous referees for their extremely helpful criticisms and suggestions.

- Crane, T. 2006. 'Is There a Perceptual Relation?' in *Perceptual Experience*, (eds.) T. Gendler & J. Hawthorne. Oxford: Oxford University Press
- Crane, T. 2013. *The Objects of Thought* Oxford: Oxford University Press
- D'Ambrosio, J. 2019. 'A New Perceptual Adverbialism' *The Journal of Philosophy* 116 8: 413-446
- Damasio, A; Yamata,T; Damasio, H; Corbetta, J. and McKee, J. 1980. 'Central achromatopsia: behavioral, anatomic, and physiologic aspects' *Neurology* 30, 1064-1071.
- Desimone, R; Albright, T D; Gross, C G and Bruce, C. 1984. 'Stimulus-selective properties of inferior temporal neurons in the macaque' *Journal of Neuroscience* 4(8): 2051-2062.
- Dinges, A. 2015. 'The Many-Relations Problem for Adverbialism' *Analysis* 75 (2):231-237
- Dretske, F. 1967. 'Can Events Move?' *Mind* 76: 479–492
- Dretske, F. 1995. *Naturalizing the Mind* Cambridge, MA: MIT Press
- Dretske, F. 2000. *Perception, Knowledge and Belief* Cambridge: Cambridge University Press
- Ducasse, C. J. 1942. 'Moore's 'The Refutation of Idealism' in P. Schlipp (ed.), *The Philosophy of G.E. Moore*, Evanston, IL: Northwestern Press
- French, C. 2018. 'Bálint's Syndrome, Object Seeing, and Spatial Perception' *Mind and Language* 33: 221-241
- Forrest, P. 2005. 'Universals as Sense-Data' *Philosophy and Phenomenological Research* 71 3: 622-631
- Friedman, H. S., Zhou, H., and Heydt, R. V. D. 2003. 'The coding of uniform colour figures in monkey visual cortex' *Journal of Physiology*. 548, 593–613.
- Forbes, G. 2006. *Attitude Problems* Oxford: Oxford University Press.
- Gazzaniga, M. S., Ivry, R. B. & Mangun, G. R. 1998. *Cognitive neuroscience: The*

biology of the mind Norton.

Glüer-Pagin, K. 2014. 'Looks, Reasons, and Experiences' in *Does Perception have Content?*

Brogaard, B. (ed.) Oxford: Oxford University Press

Goldsmith, M. 1998. 'What's in a location? Comparing object-based and space-based models of feature integration in visual search' *J. Exp. Psychol. Gen.* 127 2: 189-219

Gow, L. 2019. 'Everything is clear: All perceptual experiences are transparent.' *European Journal of Philosophy* 27: 412–425.

Gray, C. M. 1999. 'The Temporal Correlation Hypothesis of Visual Feature Integration' *Neuron*. 24(1): 31-47

Grzankowski, A. 2018. 'The Determinable-Determinate Relation Can't Save Adverbialism' *Analysis* 78 1: 45-52

Hawken, M. J. Parker, A. J. and Lund, J. S. 1988. 'Laminar Organization and Contrast Sensitivity of Direction-Selective Cells in the Striate Cortex of the Old World Monkey' *The Journal of Neuroscience* 8 10: 3541-3548

Holcombe, A. O. 2009. 'The Binding Problem' in E. Bruce. Goldstein (Ed.), *The Sage Encyclopedia of Perception*. Sage

Horgan, T, Tienson, J. & Graham, G. 2004. 'Phenomenal intentionality and the brain in a vat' in Richard Schantz (ed.) *The Externalist Challenge*. Walter De Gruyter

Hubel, D.H, Wiesel, T. N. 1959. 'Receptive Fields of Single Neurones in the Cat's Striate Cortex. *The Journal of Physiology* 148 (3): 574–91

Hubel. D. H, Wiesel, T. N 1962. 'Receptive Fields, Binocular Interaction and Functional Architecture in the Cat's Visual Cortex' *The Journal of Physiology* 160 (1): 106–54

Jackson, F. 1977. *Perception: A Representative Theory*. Cambridge: Cambridge University Press

- Johnston, M. 2004. 'The Obscure Object of Hallucination' *Philosophical Studies* 120:113–183
- Kriegel, U. 2007. 'Intentional Inexistence and Phenomenal Intentionality' *Philosophical Perspectives* 21
- Kriegel, U. 2008. 'The Dispensibility of (Merely) Intentional Objects' *Philosophical Studies* 141:79–95
- Kriegel, U. 2011. *Sources of Intentionality* Oxford: Oxford University Press
- Landisman, C. E., and Ts'o, D. Y. 2002. 'Color processing in macaque striate cortex: electrophysiological properties' *Journal of Neurophysiology*. 87, 3138–3151.
- Lavie, N. 1997. 'Visual feature integration and focused attention: Response competition from multiple distractor features' *Percept. Psychophys.* 59 4:543-56
- Lu, H. D., and Roe, A. W. 2008. 'Functional organization of color domains in v1 and v2 of macaque monkey revealed by optical imaging' *Cerebral Cortex* 18: 516–533.
- Lycan, W. 2001. 'The Case for Phenomenal Externalism' *Philosophical Perspectives* 15:17-35
- McGinn, C. 1999. 'The appearance of colour' in *Knowledge and reality: Selected essays*. Oxford: Clarendon Press.
- Meadows, J. C. 1974. 'Disturbed perception of colours associated with localized cerebral lesions' *Brain* 97, 615-632.
- Mendelovici, A. 2019a. Panpsychism's Combination Problem Is a Problem for Everyone. In William Seager (ed.), *The Routledge Handbook of Panpsychism*. London, UK: Routledge.
- Mendelovici, A. 2019b. Reply to Philip Woodward's review of *The Phenomenal Basis of Intentionality*, *Philosophical Psychology*, 32:8, 1261-1267.
- Mendelovici, A. 2018. *The Phenomenal Basis of Intentionality* Oxford: Oxford University Press

- Mishkin M., Ungerleider L.G., Macko K.A. 1983. Object vision and spatial vision: two cortical pathways. *Trends in Neurosciences*. 6:414–417.
- Nida-Rümelin, M. 2011. ‘Perceptual Presence and Perceptual Awareness: A Subjectivist Account of Openness to the World’ *Philosophical Issues*, 21 (1): 352-383
- Papineau, D. 2014. ‘Sensory Experience and Representational Properties’ *Proceedings of the Aristotelian Society* 114 (1): 1-33
- Papineau, D. forthcoming. *The Metaphysics of Sensory Experience*. Oxford: Oxford University Press
- Pautz, A. 2007. ‘Intentionalism and Perceptual Presence’ *Philosophical Perspectives* 21 (1):495-541
- Robertson, L. 2005. ‘Attention and Binding’ in *Neurobiology of Attention* L. Itti, G. Rees, J. K. Tsotsos (eds.) Elsevier: MA pp135-39
- Schellenberg, S. 2011. ‘Ontological Minimalism about Phenomenology’ *Philosophy and Phenomenological Research*. 83:1
- Sergent J, Ohta S, MacDonald B. 1992. ‘Functional Neuroanatomy of Face and Object Processing: A Positron Emission Tomography Study’ *Brain* 115:15-36
- Seymour, K, Clifford, C. W. G, Logothetis, N. K, Bartels, A. 2009. ‘The coding of color, motion, and their conjunction in the human visual cortex.’ *Current Biology* 19(3): 177-83
- Shevell, S. K., St Clair, R., & Hong, S. W. 2008. ‘Misbinding of color to form in afterimages’ *Visual Neuroscience* 1-6.
- Sosa, D. 2007. ‘Perceptual Friction’ *Philosophical Issues* 17:1 245-261
- Stoljar, D 2004. ‘The Argument from Diaphanousness’, *Canadian Journal of Philosophy*, Supp. Vol. 30 pp. 341–90

- Thau, M. 2002. *Consciousness and Cognition* Oxford: Oxford University Press
- Thompson, B. 2008. 'Representationalism and the Argument from Hallucination', *Pacific Philosophical Quarterly* 89: 384-412.
- Treisman, A. 1999. 'Feature Binding, Attention and Object Perception' in *Attention, Space and Action*, G.W. Humphries, J. Duncan and A. Treisman (eds.) Oxford: Oxford University Press, pp. 91–111.
- Treisman, A. 2003. 'Consciousness and Perceptual Binding' in Axel Cleeremans (ed.) *The Unity of Consciousness: Binding, Integration and Dissociation*, Oxford: Oxford University Press
- Tsao, D. Y and Livingstone, M. S. 2008. 'Mechanisms of face perception' *Annual Review of Neuroscience* 31: 411-437.
- Tye, M. 1984. 'The Adverbial Approach to Visual Experience' *Philosophical Review* 93: 2 195-225
- Tye, M. 1995. *Ten Problems of Consciousness* Cambridge, MA: MIT Press
- Tye, M. 2000. *Consciousness, Color and Content* Cambridge, MA: MIT Press
- Tye, M. 2002. 'Representationalism and the Transparency of Experience' *Noûs* 36:137–51
- Tye, M. 2014. 'What is the Content of a Hallucinatory Experience?' in *Does Perception have Content?* Brogaard, B. (ed.) Oxford: Oxford University Press
- Xiao, Y., Wang, Y., and Felleman, D. J. 2003. 'A spatially organized representation of colour in macaque cortical area v2' *Nature* 421: 535–539.
- Zeki, S. 1993. *A vision of the brain* Blackwell Scientific.