Perceptual content

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PERCEPTUAL REPRESENTATION/PERCEPTUAL CONTENT

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Abstract:
A straightforward way of thinking about perception is in terms of perceptual representation. Perception is the construction of perceptual representations that represent the world correctly or incorrectly. This way of thinking about perception has been questioned recently by those who deny that there are perceptual representations. I examine some reasons for and against the concept of perceptual representation and explore some potential ways of resolving this debate. Then I analyze what perceptual representations may be: if they attribute properties to entities, what are these attributed properties and what are the entities they are attributed to.

Keywords:
Perceptual representation, properties, representation, sensory individuals, content, propositional content, non-propositional content.

There are two grand questions about perceptual representations: (I) Do they exist? (II) What are they?

I. Are there perceptual representations?

Do perceptual representations exist? Twenty years ago, all philosophers of perception would have agreed that they do, but this is no longer so. In fact, it seems to be one of the most widely discussed questions about perception these days (see Brogaard forthcoming c for the current state of the debate). I will give (a) some reasons to think that there are, (b) some reasons to think that there are not and (c) some potential ways of resolving this debate.

An important clarification and disclaimer before we begin: (I) and (II) are about perception in general: not just about conscious perceptual experiences but all perception, conscious and unconscious. Both debates have sometimes been hijacked by those primarily concerned about consciousness, but this is a mistake unless one is happy to deny that there are unconscious perceptual processes (see also Chapter II/7 of this volume). Those who are interested in the peculiarities of conscious perception can read Chapter V/4 and VII/1 of this volume. This chapter is about perception in general.

I. (a) Representationalism

Many of our mental states are representations: my belief that it is raining outside represents a putative state of affairs: that it is raining outside. If I am afraid of a tiger, this fear is also directed at, or is about, something: a tiger. In other words, many mental states *refer* to something, they are *about* something: they have *content*. But then it is tempting to assume that perceptual states are also representations: they also have content: if I see a cat, it would be natural to say that my perceptual

state is about this cat. The cat (or some of the cat's properties) is part of the content of my perceptual state.[1]

A further reason for being representationalist (see also Pautz 2010): it allows us to give simple explanations for illusions and hallucinations, as well as for perceptual justification. If we think of perceptual states as representations, then veridical perception amounts to having a correct perceptual representation, whereas illusion and hallucination amount to perceptual misrepresentation (not everyone thinks this is an advantage, see Brewer 2006 and see Chapter II/4 of this volume for analysis). And as perceptual states are at least sometimes capable of justifying beliefs, thinking of them as representations allows us to explain perceptual justification as a relation between two different representations: a perceptual and a non-perceptual one (see also Chapter VII/2 and II/3 of this volume).

Thinking of perceptual states as representations is also a default assumption of (mainstream) perceptual psychology and vision science (see Burge 2005 and Nanay forthcoming c for summaries). But some philosophers (and some psychologists) are not convinced and they conceive of perception in a non-representational manner.

I. (b) Anti-representationalism

Anti-representationalism is the view that there are no perceptual representations. As it is a merely negative view, the question arises: what happens when we perceive, according to the anti-representationalist? There are a number of different suggestions, which fall into two broad categories: enactivism and relationalism.

According to relationalism, perceptual states are, in part, constituted by the actual perceived objects. Perception is a genuine relation between the perceiver and the perceived object – and not between the agent and some abstract entity called 'perceptual content' (Travis 2004, Brewer 2006, Campbell 2002, Martin 2004, 2006, but see also Byrne & Logue 2008's and Burge 2005's criticism, as well as Crane 2006 and Chapter II/4 of this volume). One reason why relationalism may seem appealing is that it captures the particularity of perception, the intuitively plausible assumption that the object of perception is always a particular token object, better than representationalism (see Soteriou 2000 for a summary).

Suppose that I am looking at a pillow. What happens if someone, unbeknownst to me, replaces this pillow with another, indistinguishable, pillow? Most representationalists will say that my perceptual state is still the same as this replacement does not make a difference to the content of my perceptual state (note that not all versions of representationalism are committed to this claim: those, for example, that conceives of content as Russellian, gappy or 'singular when filled' (see, e.g., Tye 2007, Schellenberg 2010) are not). But I am looking at two entirely different token objects before and after the swap. The relationalist thus insists that I have two completely different perceptual states.

Like relationalists, enactivists also deny that there are perceptual representations, but they give a different (but not incompatible, see Noë 2004, Hellie forthcoming) positive account of perception. According to one version of enactivism, perception is an active and dynamic process between the agent and the environment and this dynamic interaction doesn't have to be (or maybe

[1] Most of my examples are about the visual sense modality, but all the discussed views apply to all the sense modalities.

even couldn't be) mediated by static entities like representations (Chemero 2009, Port and Van Gelden 1995). Another version of enactivism emphasizes that when we see a scene, the whole scene in all its details is not coded in our perceptual system. Only small portions of it are: the ones we are attending to. The details of the rest of the scene are not coded at all, but they are available to us all along – we have immediate perceptual access to them without representing them (O'Regan 1992, Noë 2004, esp. pp. 22-24).

One may wonder whether these enactivist arguments give us reason to abandon the idea of perceptual representations *per se* or maybe only to conclude that they are not static or not detailed. In short, some of the enactivist arguments may give us good reason to prefer certain kinds of perceptual representations over others within the representationalist framework. But that is clearly not the aim of most enactivists, who want to reject the whole idea of perceptual representations.[2]

I. (c) Ways of resolving this debate

The debate about perceptual representation is a subtle one and both sides should be taken seriously. I offer four possible ways of resolving this debate by (i) capturing some anti-representationalist intuitions within the representationalist framework, by (ii) discrediting anti-representationalism on empirical grounds, by (iii) exploring the possibility that the two camps are talking about different phenomena, and by (iv) finding a framework where the two views can co-exist as different explanations in different explanatory projects.

I. (c) i. Accommodating anti-representationalist intuitions within the representationalist framework

One way of resolving the representationalism vs. anti-representationalism debate would be to account for the most important anti-representationalist considerations within a representationalist theory. The enactivist considerations against static and detailed, snapshot-like representations may be easier to accommodate within the representationalist framework (by conceiving of perceptual representations as dynamic and dependent on attention, see Clark 1997, Nanay 2010a) than the relationalist ones. As we have seen, a crucial relationalist argument comes from the particularity of perception: we always perceive token objects and the perception of different token objects constitute very different perceptual states. Representationalism, the argument goes, cannot account for this.

But is this argument conclusive? It has been argued that if we interpret perceptual content as 'Russellian', 'gappy', 'Russellian gappy', 'Fregean gappy', 'singular', 'object-involving' or 'singular-when-filled' (see, e.g., Soteriou 2000, Martin 2002, Loar 2003, Tye 2007, Schellenberg 2010 and see Chalmers 2004, 2006, Siegel 2006b, Bach 2007 for discussion), then we can account for the particularity of perception within the representationalist framework. The general idea is that perceptual content is different from the content of beliefs in that it depends constitutively on the

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[2] A consequence of both versions of anti-representationalism is that perceptual illusion cannot be accounted for as misrepresentation. If I see an object as P but it is in fact Q, this cannot be explained in terms of perceptually misrepresenting the properties of this object. Different anti-representationalists give different alternative explanation for perceptual illusions. I will not say much about this – the question is discussed at length in Chapter II/4 of this volume (see also Travis 2004, Brewer 2006).

perceived token object. This dependence can take various forms (see below), but the general idea is that this allows for a difference in our perceptual content when we are looking at the two pillows in the example I used above.[3]

According to a somewhat different suggestion, we could use the old idea that perception attributes tropes (property-instances that are logically incapable of being instantiated by two different entities at the same time) and not universals (Mulligan 1999, Mulligan et al. 1984, Campbell 1990) to argue for the particularity of perception within a representationalist framework (Nanay 2012b).

I. (c) ii. Disputing anti-representationalism on empirical grounds

We can also bring in empirical considerations to decide this debate. There seem to be at least two well-documented empirical phenomena that are difficult to account for in an anti-representationalist manner: dorsal vision and the multimodal character of perception (see Nanay forthcoming c).

The first one is dorsal vision. Humans (and other mammals) have two visual subsystems that use different regions of our central nervous system, the ventral and dorsal streams. To put it very simply, the ventral stream is responsible for identification and recognition, whereas the function of the dorsal stream is the visual control of our motor actions. In normal circumstances, these two systems co-function, but if one of them is removed or malfunctioning, the other can still function relatively well (see Milner – Goodale 1995, Goodale - Milner 2004, Jacon-Jeannerod 2003 for overviews, see also Brogaard forthcoming a and b, as well as Chapter II/5 of this volume).

In healthy humans the way the dorsal and the ventral stream works can come apart in some circumstances, as in the case of the three dimensional Ebbinghaus illusion. The two dimensional Ebbinghaus illusion is a simple optical illusion. A circle that is surrounded by smaller circles looks larger than a circle of the same size that is surrounded by larger circles. The three dimensional Ebbinghaus illusion reproduces this illusion in space: a poker-chip surrounded by smaller poker-chips appears to be larger than a poker-chip of the same diameter surrounded by larger ones. The surprising finding is that although our judgment and experience of the comparative size of these two chips is incorrect as we judge the first chip to be larger than the second one, if we are asked to pick up one of the chips, our grip-size is barely influenced by the illusion (Aglioti et al. 1995, cf. Gillam 1998 and Franz et al. 2003, see also Daprati & Gentilucci 1997 and Bruno 2001). The usual way of explaining this finding is that our dorsal stream represents more or less correctly, but the ventral stream misrepresents.

This is the representationalist way of describing the 3D Ebbinghaus case: we have two perceptual representations, a dorsal and a ventral one and they represent the chip as having different size properties. But what can the anti-representationalist say? If perception is a relation between the perceiver and the perceived token object's properties, then we have one perceptual relation here: the one between the perceiver and the perceived token poker chip. But then which property of the perceived object constitutes the other one of the two *relata* of this relation? The property we experience the chip as having or the one that our grip-size seems to be tracking? These two

[3] Another way of accounting for the particularity of perception within the representationalist framework is to make a distinction between the demonstrative meaning (a la Kaplan 1989) and the content of a perceptual state, where the latter is different, but the former is the same when we are looking at the two pillows.

perceptual episodes are both relations to the very same token object: the same poker chip, and the properties of this same poker chip. And two different perceptual episodes cannot be constituted by the very same perceptual relation.

If, on the other hand, as the enactivist says, "the world is our external memory", then what serves as our external memory here: the property we experience the chip as having or the one that our grip-size seems to be tracking? It is difficult to see what would even be meant by having two different 'worlds as our external memory'.

The second empirical phenomenon that may cast doubt on the anti-representationalist framework is multimodal perception – the fact that our sense modalities interact in a variety of ways (see Spence-Driver 2004 for a summary as well as O'Callaghan 2008b and Chapter V/1 of this volume, forthcoming for philosophical overviews). Information in one sense modality can influence the information processing in another sense modality at a very early stage of perceptual processing (often in the primary visual cortex in the case of vision, for example, see Watkins et al. 2006). A simple example for this is ventriloquism, where vision influences our audition: we experience the voices as coming from the dummy and not from the ventriloquist (see Bertelson 1999). But there are more surprising examples: if there is a flash in your visual scene and you hear two beeps while the flash lasts, you experience it as two flashes (Shams et al. 2000).

What is the most important for us from this literature is that the multimodality of perception presupposes that information from two different sense modalities is unified in a shared framework (see, e.g., Vroomen et al. 2001, Bertelson and de Gelder 2004). Noise coming from above and from the left and visual information from the upper left corner of my visual field are interpreted by the perceptual system as belonging to (or bound to) the same sensory individual (whatever that may be – see below). This is easy for the representationalist to analyze: vision attributes a property to a part of the perceived scene and audition attributes a different property to the same perceived scene. The two different sense modalities represent the same scene as having different properties.

To put it very simply, multimodal perception seems to require matching two representations, a visual and the auditory one. If we cannot talk about perceptual representation, how can we talk about what is being matched? The auditory sense modality gives us a soundscape and vision gives us a visual scene and our perceptual system puts the two together. It is difficult to explain this without any appeal to representations. The enactivist arsenal seems insufficient: they can appeal to the active exploration of the multimodal environment, but this is unlikely to help here: we are actively exploring the world that is given to us in both sense modalities – but this in itself requires multimodal integration. In short, the active exploration of the environment presupposes multimodal integration, which, in turn, seems to presuppose representations. They can also insist that the active exploration of the environment happens separately in each sense modality – but this is in conflict with the findings about multimodal integration very early in perceptual processing (as early as the primary visual cortex, see Watking et al. 2006).

The relationalist version of anti-representationalism also seems powerless as the relation between the perceiver and the token perceived object that constitutes perception seems to be the outcome of this process of unifying multimodal information: our experience of the perceived token object (thus, presumably, the perceptual relation) is brought about by this unification process. The argument from multimodality seems to show that the phenomena anti-representationalists emphasize, be it the active and dynamic exploration of the environment or the relation to a token object presuppose the coordination of information in the different sense modalities, but this can only be accounted for in representational terms.

I. (c) iii. Different explanada*?*

The most promising strategy for the anti-representationalist for countering these empirical considerations is probably to insist that the claim that there are no perceptual representations is to be understood as a claim about perceptual *experiences*: it is perceptual experiences that are not representations; unconscious perceptual states may well be. In fact, at least some of the relationalist accounts are explicitly about perceptual *experiences* and not about perceptual states. Enactivists would be less happy with this proposal as they are often explicit about not limiting their attention to conscious or even personal level phenomena (see esp. Ballard 1996, Noë 2004, pp. 28-32).

The suggestion then would be: representationalism for unconscious (or maybe subpersonal level) perception and anti-representationalism for conscious (or maybe personal level) perception (I leave aside the differences between these two distinctions as well as the general worries about the personal/subpersonal divide (see, esp. Bermúdez 2000). In fact, John McDowell could be interpreted as endorsing a version of this proposal: he argued that while a representationalist picture is the correct one for the sub-personal level, we should accept J. J. Gibson's claims with regards to the personal level, which would make his view (at least in this respect) a version of enactivism (McDowell 1994).

One important problem with this view is that the differential treatment of conscious and unconscious perception is difficult to square with the general aim of both the representationalist and the relationalist camp to give a general account of perception – that is, not just conscious perception, but perception *per se*.

I. (c) iv. Different explanatory projects?

Finally, one could argue that we need both representationalism and anti-representationalism as they will be able to help us in different explanatory projects about perception (Nanay forthcoming b). We can think of the representationalism vs. anti-representationalism debate as a debate about how to individuate perceptual states. As we have seen in the pillow example above, representationalism (or at least some versions thereof) lumps together the two perceptual episodes, whereas relationalism thinks of it as two very different perceptual states. Hence, the real question is whether these two perceptual states belong not just to the same type but whether they belong to "the same fundamental kind" (Martin 2004, p. 39, p. 43). The representational view says they do; the relational view says they don't. Belonging to a 'fundamental kind' is supposed to "tell what essentially the event or episode is" (Martin 2006, p. 361).

It is easy to spot the essentialist assumptions in this way of characterizing the representationalism vs. anti-representationalism debate. And the hope is that if we discard this essentialist assumption, we may be able to reconcile the two views.

Why should we always individuate perceptual states in the same way? It seems that the individuation of biological traits in general is dependent on the explanatory project at hand; why would perceptual states constitute an exception? There are at least three ways of individuating biological traits: the functional (in terms of what they are for), the morphological (in terms of their structural properties) and the homological (in terms of their history). But depending on the explanatory project, biologists use different ways of individuating trait-types. Paleontologists do not consider the forelegs of an ancient amphibian to be wings. But embryologists do consider the morphologically very similar trait of the embryos of birds to be wings. Biologists and philosophers of biology then gave up on trying to find one unified theory of trait type individuation: in different

explanatory contexts, we should use different criteria for individuating biological traits (Nanay 2010b). The suggestion is that philosophers of perception would be well advised to make the same move.

Our perceptual system is an evolved mechanism. Just like birds' wings. Thus, if we have good reasons to doubt that there is one and only one way of individuating wings, we also have a prima facie reason to doubt that there is one and only one way of individuating perceptual states. If the individuation of other biological traits depends on the explanatory project, we should expect that so does the individuation of perceptual states (see also Matthen 1998).

In the case of some explanatory projects, we should individuate perceptual states according to representationalist criteria. If, for example, a vision scientist is doing research on the shape-recognition mechanisms of the human perceptual system, this may be the natural way to proceed. But in the case of some other explanatory projects, the relationalist way of individuating perceptual states is more appropriate: if a psychologist or philosopher is, for example, enquiring into the differences and similarities between vision and visual imagery, then thinking of perceptual states in a relationalist manner may be more helpful.

II. What are perceptual representations?

Let us suppose that there are perceptual representations. The question now is: what are they? There are two very different approaches to characterizing perceptual representations (these are not two kinds of theories, but rather two kinds of general approaches).

The first one is to start out with non-perceptual representations, typically beliefs or other propositional attitudes, and see how what we know about representations of this kind can be modified in order to apply to the perceptual case. Some think that there is no need for any modification: perceptual content is exactly the same as belief content. But most philosophers who think of perceptual content this way allow for some differences – while nonetheless maintaining that we should use propositional content as a model for understanding perceptual content.

Much of these proposed modifications aim to address the problem of the particularity of perception that I mentioned above. The general idea is that unlike the content of beliefs, perceptual content somehow depends constitutively on the token perceived object. These 'Russellian', 'gappy', 'singular', 'object-involving' or 'singular-when-filled' conceptions of perceptual content, however, are nonetheless conceptions of propositional content – as David Chalmers says, these accounts are thinking about perceptual content as a "structured complex" (Chalmers 2006, p. 54 – Thompson 2009 describes them even more aptly as "structured propositions").

The second approach to characterizing perceptual representations is to resist the temptation to start out with belief content and instead use a more basic way of thinking about content in general that can subsume both belief content and perceptual content. We have no reason to believe that all mental representations are linguistically or propositionally structured (see Crane 2009, but see also Siegel 2010b). Some (but not all) mental states have content. Some of these (but not all of them) have conceptual content (see also Chapter II/3 of this volume). And some of these (but not all of them) have propositional content. But perceptual states don't.

What would then be a general enough way of thinking about mental representations in a not necessarily propositional manner? A reasonable suggestion is to think of them as attributing properties to entities. And if we think of mental representations in general as attributing properties to entities, then we should think of perceptual representations as perceptually attributing properties to the perceived scene.

Clarifications: (a) what are these properties? (b) what is the 'perceived scene'? (c) what makes the attribution perceptual?

II. (a) Perceptually attributed properties

What are these properties that are perceptually attributed when we perceive? We have seen one way of understanding this question: are these properties tropes or universals? I address two more ways in which the nature of the perceptually attributed properties needs to be specified: (i) What is the range of properties that are perceptually attributed? (ii) Are they determinates or determinables (or maybe super-determinates)?

II. (a) i. Which properties are perceptually attributed?

Beliefs can represent their objects as having any property. Perceptual states, in contrast, represent their objects as having a limited set of properties. Some plausible candidates include having a certain shape, size, color and spatial location. The list may be extended but it will not encompass all properties. The property of having been made in 2008 in Malaysia is unlikely to be represented perceptually – it is a property that is likely to be attributed by a non-perceptual state.

The question is then which properties are represented in perception and which ones are not. A couple of quick examples: it has been argued that we perceive objects as trees and tables (Siegel 2006a), as being causally efficacious (Siegel 2005, 2009), as edible, climbable or Q-able in general (Nanay 2011a, 2012a), as having action-properties (Nanay forthcoming a), as agents (Scholl and Tremoullet 2000), as having some kind of normative character or value (Kelly 2010, Matthen 2010), as having dispositional properties (Nanay 2011b), as having moral value (Kriegel 2007) and as affording certain actions (for very different versions of this claim, see Gibson 1966, 1979, Bach 1978, esp. p. 368, Jeannerod 1988, Jeannerod 1994, esp. Section 5, Jeannerod 1997, Jacob-Jeannerod 2003, esp. pp. 202-204, Humphreys - Riddoch 2001, Riddoch et al. 1998, esp. p. 678).

Depending on our view on what range of properties we attribute perceptually, we end up with very different view of perceptual content and, as a result, of perception in general.

II. (a) ii. The determinacy of perceptually attributed properties

Another important question about perceptually attributed properties concerns their degree of determinacy (Johnston 1921, Funkhouser 2006). Being red is determinate of being colored, but determinable of being scarlet. The determinable-determinate relation is a relative one: the same property, for example, of being red, can be the determinate of the determinable being colored, but the determinable of the determinate being scarlet. Properties with no further determinates, if there are any, are known as super-determinates.

Are the perceptually attributed properties super-determinates? It has been argued that quite often they are not (Dennett 1996). Some of the properties we perceptually attribute to the perceived scene are determinates or even super-determinates. But some others are determinable properties. Our peripheral vision is only capable of attributing extremely determinable properties. But even some of the properties we perceptually attribute to the objects that are in our fovea can be determinable. The perceptually attributed properties differ in their determinacy and, as we shall see below, part of what this difference in determinacy depends on is a difference in our perceptual attention.

II. (b) Sensory individuals

If we have clarified what properties are attributed in perception, we need to ask what our perceptual system attributes these properties to. In other words, what are the individuals that we perceptually represent as having these properties? Following Cohen 2004, I call these individuals 'sensory individuals'. I'll address two questions about sensory individuals: what they are and how they show up in perceptual content.

One widespread view about sensory individuals is that they are ordinary objects like apples and chairs (Matthen 2005, Pylyshyn 2007, Cohen 2004, Matthen 2004, 2010). Another, much less widespread, one is that they are regions in space-time (Clark 2000, 2004). The ordinary object view is seen as the more promising one, both on conceptual (Cohen 2004, Matthen forthcoming, Siegel 2002) and on empirical (Blaser et al. 2000) grounds (see also Chapter IV/1 of this volume).

But, to make things even more complicated, it is not clear that sensory individuals of different sense modalities are the same. It has been argued that while the sensory individuals of vision are ordinary objects, in the auditory sense modality, they are sounds (O'Callaghan 2008a, Nudds 2007). This suggestion, in turn, raises various questions about what sounds are (Kulvicki 2008, O'Callaghan 2007, Pasnau 1999, Nudds & O'Callaghan 2009, Dokic-Casati 1994). Similar suggestions have been made about olfaction, where the sensory individuals are supposed to be odors (Lycan 2000, Batty 2010, 2011). See Chapter III/2 and III/4 of this volume on these sense modalities.

Another important question about sensory individuals is about how they show up in perceptual content. The classic representationalist view is that they are also represented by our perceptual states: both the attributed properties and the sensory individuals that these properties are attributed to are part of our perceptual content. But, partly under pressure to account for the particularity of perception, it has been suggested that the sensory individual does not need to be represented: only the properties are and there is a 'gap' in the perceptual content where actual objects stand in for sensory individuals (Tye 2007, Schellenberg 2010). Although, as we have seen above, most of these proposals consider perceptual content to be propositional, this is not a necessary feature of this general strategy. If we, as I suggest, think of perceptual content as the perceptual attribution of properties, this leaves open the possibility that the entity these properties are attributed to is not part of the perceptual content, but 'fills the gap' that is in the perceptual content. This would be a move equivalent to the one made by the advocates of the 'Russellian', 'gappy', 'singular', or 'singular if filled' accounts of perceptual content and it would address the problem of the particularity of perception in a similar manner.

II. (c) Perceptual content

What makes this attribution of properties perceptual? The sentence 'The cat I am looking at is wet' also attributes properties to the perceived object, but it nonetheless does not do so perceptually. Without intending to come up with a necessary and sufficient condition for perception, it needs to be pointed out how perceptual content differs from the content of this sentence.

There is no easy way t draw this distinction. One important potential difference is that while the entity that the properties are attributed to is propositionally identified in the sentence, it is identified spatially in the perceptual case (see Peacocke 1989, 1992). Perceptual content, in short, is not propositionally, but spatially organized (on this classic difference, see, e.g., Kosslyn et al. 2006).

And this leads to another difference between the content of this sentence and perceptual content: the different role attention plays.

It has been argued that perceptual attention is a necessary feature of perceptual content (Nanay 2010a). More precisely, attention makes the attended property more determinate (see also Yeshurun and Carasco 1998 for empirical evidence and Findlay & Gilchrist 2003 for a summary). If I am attending to the color of my office telephone, I attribute very determinate (arguably super-determinate) properties to it. If, as it is more often the case, I am not attending to the color of my office telephone, I attribute only determinable properties to it (of, say, being light-colored or maybe just being colored). In short, attention makes the perceived property more determinate. If this is indeed so, this would constitute a genuine and unique feature of perceptual content. The concept of attention plays a more and more important role in philosophy of perception (see Prinz 2010, and Chapter V/3 of this volume). One important question is whether and how it characterizes perceptual content.

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