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Affordances and Phenomenal Character in Spatial Perception

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1. Introduction

According to *intentionalism* the phenomenal character ("what it's like") of a conscious experience is determined wholly by its representational content. In its strongest forms intentionalism offers the tantalizing prospect of a reduction of phenomenal character to representational content. Arguments based on Twin Earth-like scenarios have shown, however, that if phenomenal character supervenes on the internal configuration of the subject then it cannot be reduced to wide representational content.[1] Consequently, most intentionalists have now divided into two main camps. *Phenomenal externalists* accept the reduction of phenomenal character to wide representational content but deny the supervenience of phenomenal character on the internal configuration of the subject.[2] By contrast, *phenomenal internalists* accept the supervenience of phenomenal character on the internal configuration of the subject but hold that the representational content that determines the phenomenal character of an experience (known as its *phenomenal content*) is narrowly individuated. Existing phenomenal internalist theories have, however, been unable to specify the relevant narrow content without ineliminable reference to the phenomenal character of the experience. Such theories therefore abandon the reduction of phenomenal character to representational content.

Both options have significant drawbacks. Phenomenal externalism is often found implausible because of the extent to which it requires loosening the connection between conscious states and brain states. On the other hand, insofar as it is non-reductive, phenomenal internalism is a weaker and thus less interesting claim than a reductive theory (which is not to say that it is of no interest at all). In any case, I shall

[1] The tension between intentionalism and content externalism has been brought out vividly in several articles by Ned Block (e.g. 1990, 1995), particularly with the aid of his *Inverted Earth* thought experiment.
[2] See for example Dretske 1993, 1996, Lycan 2001, Tye 2002, Byrne and Tye 2006.

put forward a version of intentionalism that offers the best of both worlds, combining phenomenal internalism with the possibility of a reduction of phenomenal character to representational content. The key feature of this theory is that the crucial elements of phenomenal content consist of relations between the subject and the subject's environment similar to those that James Gibson (1979) dubbed *affordances*. I claim that an experience with a given phenomenal character represents the same affordance (or set of affordances) in all possible worlds and for all subjects, which allows, though admittedly does not require, the reduction of phenomenal character to representational content. An experience can also be said to represent ordinary properties, however, in a manner that I shall explain.

I shall use visual spatial experience as a case study in what follows. Spatial experience makes it easiest to illustrate the view that I shall defend, though I am well aware that some other kinds of experience, especially colour experience, are likely to raise significant new challenges.[3] Nonetheless I assume that if the theory can be defended for spatial experience then it is worthy of further consideration as a starting point for a theory of conscious experiences of all kinds.

2. Some scene-setting

To be more precise, intentionalism – also sometimes known as *representationalism* – says that for every phenomenal character *P* there is a representational content *R* such that necessarily, a conscious experience has *P* if and only if it has *R*. *R* is known as the *phenomenal content* of the experience. The strongest versions of intentionalism include all possible phenomenal characters in the domain of quantification and hold that the necessity of the biconditional is logical (i.e. it is true in every logically possible world); other versions weaken the claim in various ways, for example by holding that the necessity of the biconditional is only nomological (i.e. it is true in every nomologically possible world) or by restricting the range of experiences covered by the theory.[4] The

[3] For some hints at the kinds of affordances that might be associated with colours, however, see Thompson 1995 and Dennett 1991, 375-383.

[4] See Byrne 2001 and Chalmers 2004 for helpful distinctions between different varieties of intentionalism.

domain of quantification might, for example, be restricted to the experiences of a given type of subject, or to paradigmatically perceptual experiences rather than bodily sensations. Many intentionalists exclude particulars from phenomenal content in order to explain why qualitatively identical but numerically distinct twins look the same (i.e. perceptual experiences of them have the same phenomenal character). Natural kinds are often also excluded for similar reasons. For brevity in what follows I shall say that *P* and *R correlate* when the above biconditional holds, and I shall speak of correlation *across* a given range of worlds and/or subjects when the experiences in those worlds and/or subjects are included in the domain of quantification.

By "narrow" and "wide" content, respectively, I mean content that does, or does not, supervene on the internal configuration of the subject. Some intentionalists (e.g. Egan 2006, 513, footnote 42) distance themselves from more specific notions of "narrow content" such as Fodor's (1987) even though their candidates for phenomenal content are still narrow in the sense that is relevant here.

The simplest versions of intentionalism are *Russellian*.[5] They hold that phenomenal contents are *Russellian* contents, purely extensional wide contents construed either as ordered n-tuples of objects and properties or as sets of possible worlds (the latter distinction will not be important for our purposes, so I shall gloss over it in what follows). Existing reductive versions of intentionalism combine Russellian phenomenal contents with phenomenal externalism.

A further constraint is usually added to reductive versions of intentionalism to avoid the theory entailing that literally *any* state that has *R* has *P*, for example by including only mental states with *R* and the right kind of functional role.[6] It is usually assumed that a reductive theory should apply to all conscious states, including pains and other bodily sensations. In what follows, however, I shall set this latter issue aside; the focus here will be on paradigmatic conscious perceptual states, especially those involved in spatial perception.[7] It will perhaps be no surprise that there is a tension between phenomenal internalism and wide Russellian phenomenal content, but I shall

[5] The best-known advocates of Russellian intentionalism are Michael Tye (1995, 1996, 2000, 2002, 2003) and Fred Dretske (1993, 1995).
[6] See Tye 1995, 2000, 2002 for this type of view.
[7] For defences of intentionalism with respect to pains, bodily sensations etc., however, see Byrne 2001 and Tye 2002, 2003.

in any case argue for this in the spatial case below.

Theories that instead combine phenomenal internalism with narrow phenomenal content can be sub-divided into *Fregean* and *Appearance Property* theories. *Fregean* intentionalism (Chalmers 2004, Thompson 2007, 2010) divides perceptual content into two components: a Russellian content, and *mode of presentation* of the Russellian content. The phenomenal content of an experience is identified with the mode of presentation, which is narrowly individuated.

Appearance Property theories identify phenomenal content with a narrow first-level content consisting of properties of the general kind that Sydney Shoemaker has called *appearance properties*, though a number of different candidates for appearance properties have been put forward (Shoemaker 1994, 2001, 2006; Egan 2006). Examples of appearance properties include the disposition to produce experiences of a given phenomenal kind in a subject of a given type; though there have been several variations on this theme. These theories reject the two-layer content structure of Fregean intentionalism; although appearance properties can be thought of as an extra "layer" of content they are not related to the standard Russellian contents as modes of presentation of them.[8] I shall discuss some influential versions of the Fregean and Appearance Property views in more detail below.

I shall proceed as follows. After outlining what I mean by an *affordance* in the next section I shall briefly discuss the "two trees" objection to Russellian intentionalism put forward by Christopher Peacocke (1983, chapter 1), along with Michael Tye's (1996, 2002) well-known response. This will lead us to a spatial analogue of Ned Block's (1990, 1995) Inverted Earth thought experiment, involving the spatial experiences of different-sized subjects. This will show that Tye's solution to the two trees problem does not rescue Russellian intentionalism after all. A very similar thought experiment has been discussed recently by Brad Thompson (2010) in defense of a version of Fregean intentionalism, though the general question of how the size of a creature affects its perception of size and distance can be traced back to Berkeley's (1948/1957) "mite" example. Although I agree with Thompson about the problems faced by Russellian intentionalism, I argue that a plausible conclusion to draw from the

[8] The appearance property view can be thought of as Russellian insofar as the appearance-property contents are purely extensional; however this is not true of Egan's centered worlds view (see below).

thought experiment is that phenomenal content consists of affordances. I then discuss the relation between the affordance view, the Fregean theories of David Chalmers and Brad Thompson, and the Appearance Property theory of Andy Egan. Finally I discuss the relation between phenomenal content and wide content, proposing a view according to which a perceptual experience can be ascribed contents of differing degrees of generality, depending on our explanatory purposes in doing so. This accounts for the sense in which spatial properties can be perceived even though they do not figure in phenomenal content.

3. Affordances

An affordance, as I shall use the term, is a relation between a subject and an object that depends on the causal powers of the subject and, in many cases, the causal powers of the object. It is a relation that has to do with the possibilities for causal interaction between the subject and the object; this is why the obtaining of the relation generally depends on the causal powers of both. I do not claim that all affordances can be perceived; but I do claim that phenomenal contents typically, and perhaps always, consist at least partially of affordances.

To make the notion of an affordance clearer it will help to have some examples. There is a use of the word 'heavy' that captures a relation between a subject and an object that depends on the causal powers of both, and this relation is an example of an affordance. Whether something is heavy, in this sense, is a largely a matter of how hard it is for a given subject to lift.[9] If you are stronger than me then the same object may be heavy for me, but not heavy for you; so the difference in our causal powers matters. Similarly, whether or not a given object is heavy for me depends on the mass of the object; so the causal powers of the object matter. (Strictly speaking, since an object may be heavy for me on Earth, but not on the moon, it is the causal powers of the object in a given environment that matter). Whether or not actual uses of 'heavy' are of this kind is not the point; the word could be used in this way (and I think it is

[9] This is oversimplified – a heavy object may also be hard for the subject to push, dangerous if it falls on the subject, and so on – but the oversimplified account will serve to capture the general idea.

quite intuitive to do so) and, if so, it would thereby be used in talking about an affordance.

If I describe an object as heavy, using the word in this way, then what I say is true if and only if the object is heavy for *me* (i.e. hard for *me* to lift). Consequently being heavy, in this sense, is not a property of an object, but instead is a relation between an object and a subject, even though 'is heavy' can be used as a one-place predicate. When 'heavy' is used in this way the subject is an *unarticulated constituent* of the content of an utterance of '*x* is heavy'.[10] I suggest that this is similarly a feature of phenomenal content; when I perceive an object as feeling heavy my experience arguably contains no articulated representation of myself. Nonetheless my causal powers are part of what determines whether the object is heavy (for me).

It seems plausible that phenomenal characters correlate with affordance relations in at least some cases. How heavy an object *feels* arguably depends on how difficult it is for the subject to lift. Moreover, stronger and weaker subjects may differ in how heavy the same object feels to them, even though neither of them perceives its weight incorrectly. I shall argue in what follows that phenomenal content is made up of affordance relations analogous to (and perhaps even including) *heavy*, and that properties are nonetheless perceived in much the same way that the weight of an object can be perceived, by virtue of how heavy it feels. A property such as weight correlates with the "heaviness" phenomenology for a given subject, even though the phenomenology may differ between subjects with different causal powers who veridically perceive the same weight.

Many affordances, including *heavy*, concern ways in which the subject can or cannot act on the environment. There are also affordances that concern the possible effects of the environment on the subject, however. A possible example of this is *poisonous*. Although we can use the word 'poisonous' to talk about a property (the property of being harmful to normal humans when ingested), there is a use of the term wherein something can be poisonous to one kind of organism but not poisonous to

[10] The phrase *unarticulated constituent*, and (as far as I know) the idea that the content of an experience can contain the subject as an unarticulated constituent, derives from Perry 1986. Similar ideas have also been described by John Campbell (1993, 1994, 1998) and Sydney Shoemaker (1994). Campbell (1993, 1994, 1998) has described expressions like *heavy*, where the subject's causal powers come into the truth conditions without explicit articulation, as *causal indexicals*.

another. Being poisonous, in this sense, is a relation between the substance and the organism that ingests it. Whether a given substance is poisonous to a given organism depends on the causal powers of both. It might be argued that when a poisonous substance tastes unpleasant, as many naturally occurring poisons do, this is a perceptual representation of the substance as possessing a *poisonous* affordance (though this is of course an oversimplification, since there is not just one "poisonous" taste).

Relations like *heavy* and *poisonous* seem similar to what Gibson had in mind with his notion of an *affordance*:

> The affordances of the environment are what it offers the animal, what it provides or furnishes, either for good or ill… I mean by it something that refers to both the environment and the animal in a way that no existing term does. It implies the complementarity of the animal and the environment. (Gibson 1979, 127)

Many aspects of Gibson's theory of perception are controversial, but we need not accept very much of Gibson's theory in order to borrow the word 'affordance' and use it with at least roughly the same meaning.[11] Neither need we agree with Gibson about which affordances are perceived. Gibson controversially held that we perceive very fine-grained affordances; for example he held that a postbox "affords letter-mailing to a letter-writing human in a community with a postal system" (Gibson 1979, 139). This might be regarded as over-intellectualizing the nature of perception. For our purposes, however, we can leave open as an empirical matter the question of exactly which affordances are represented. We can also leave it open how many affordances are perceived. Perhaps for any single phenomenal character a single affordance is perceived; or perhaps it would be better to speak in terms of sets of affordances in order to reflect the multi-faceted significance the perception may have for the subject's actions. This is a terminological matter that will make no difference to what follows.

One possible distraction should be eliminated before proceeding to the spatial case.

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[11] Gibson, and those influenced by him, are often associated with a denial that perception involves representation at all. This would of course be incompatible with intentionalism. As far as I can see, however, there is nothing in Gibsonian or neo-Gibsonian arguments that provides any reason to think that affordances cannot be represented, insofar as anything can be represented in perception at all. For a recent example of the kind of anti-representationalist approach at issue see Noë 2004.

In their everyday uses, words like 'heavy' and spatial terms like 'near' and 'small' are context-dependent in various ways. Some newborn babies are said to be heavy while some aircraft are said to be light, for example, and Paris may be said to be far away yet Alpha Centauri is said to be nearby. The contents of perceptual experiences, however, do not plausibly vary with conversational context in the way that the contents of linguistic expressions do. One may, in one context, describe an object as feeling heavy, yet in another context, with no difference in the phenomenology, describe the very same object as feeling light; but presumably this is because the semantic values of the words, not the contents of the experiences, change according to the context. Perhaps all that has changed is the comparison class against which one expects one's audience to interpret one's utterance. It is therefore necessary to be careful to avoid confusion when using linguistic expressions of this kind to describe the contents of the perceptual experiences of individuals in differing circumstances, as I shall do below; the contextual factors that could influence the linguistic content, but not the perceptual content, must be thought of as held fixed. So, for example, when I say that different objects are equally heavy for differently constituted subjects, this should be taken to mean that those objects are equally difficult for the subjects to lift. It doesn't matter *how* difficult they are to lift, provided the same standard is adopted throughout. The relevant aspects of the context of use of 'heavy', 'near', etc. should therefore be thought of as held fixed throughout this paper.

4. The two trees

Consider a normal human subject who sees two trees that are qualitatively indistinguishable with regard to every intrinsic feature including size, but are located at different distances from the subject. The two trees appear to the subject to be the same size; at any rate, under normal conditions, the subject would judge on the basis of visual experience that the two trees were the same size. Thus there seems good reason to say that the subject's visual experience represents both trees as having the same size. Yet the two trees are experienced with different phenomenal characters; as Peacocke put it, "there is also some sense in which the nearer tree occupies more of

your visual field than the more distant tree. This is as much a feature of your experience itself as is its representing the trees as being the same height" (1983, chapter 1). Peacocke concluded from this that there is more to the phenomenal character of a perceptual experience than its Russellian representational content. If Peacocke were right about this then Russellian intentionalism would be false. Michael Tye (1996, 2002), however, has claimed that Russellian intentionalism is easily rescued if the visual experience represents not only the sizes and other visible intrinsic properties of the trees, but also the size of the visual angle subtended by each tree when viewed from the place from which it is being viewed.[12] The different trees subtend different visual angles from the position of the observer, and this is represented in experience; that is why they look different. Since, for a given tree height, visual angle varies with distance, Tye could also have appealed to differences in represented distance. But perhaps differences in represented distance *per se* would not account for the relevant phenomenological differences as straightforwardly as differences in represented visual angle.

5. Miniature people

I shall now argue, however, that the Russellian theory, according to which the phenomenal content of spatial experience consists of spatial properties such as sizes, distances or visual angles, cannot be defended without appeal to phenomenal externalism. I think that phenomenal externalism is particularly implausible in the spatial case because of some odd consequences that I shall mention below, though I should emphasize that my purpose here is to provide an alternative to phenomenal externalism rather than to argue directly against it.

Berkeley noticed the possible significance of the experiences of different-sized subjects for an account of spatial perception. In *Three Dialogues Between Hylas and Philonous* he wrote:

[12] See also Noë 2004, 82-3 for a similar point.

> *Philonous*: Answer me, Hylas. Think you the senses were bestowed upon all animals for their preservation and well-being in life? […] If so, is it not necessary they should be enabled by them to perceive their own limbs, and those bodies which are capable of harming them? […] A mite therefore must be supposed to see his own foot, and things equal or even less than it, as bodies of some considerable dimension; though at the same time they appear to you scarce discernible […] And to creatures less than the mite they will seem yet larger […] Insomuch that what you can hardly discern, will to another extremely minute animal appear as some huge mountain. (Berkeley 1948-1957, 188.)

The question posed here is whether the world looks the same, in respect of its spatial properties, to creatures of different sizes; Berkeley's claim is that it does not, and that this is connected with the differing significance of a perceived object for the actions of differently constituted creatures. I think that this is correct, though I shall not draw Berkeley's radical conclusion that spatial extension exists "only in the mind".[13]

One way to think about the experiences of different-sized subjects would be to imagine someone shrinking, as in Hollywood's *The Incredible Shrinking Man* (Jack Arnold, 1957). In this film one of the characters, Scott Carey, shrinks to the size of an insect. Carey is depicted living in a dolls house and fighting battles with a seemingly giant spider. It is certainly very natural to think that the same things look bigger to Carey as he shrinks. But perhaps a single subject that shrinks introduces unnecessary complications. One might, for example, worry about whether, when Carey utters words like 'large' and 'small', they retain the same extensions that they had in utterances that he made before shrinking. If so, then if he now describes the spider as large he speaks falsely. Similarly if he now judges the spider to be large on the grounds that, as he would put it, it looks large to him, then one might question whether his perceptions of size continue to be veridical; perhaps his experience now *falsely* represents the spider as being larger than it is. If so, then there is no evidence of a change in the relationship between the representational content and phenomenal

[13] Berkeley 1948-57, 188. He also suggested that space is understood by the subject in terms of effort; a view that does have some connections to the view to be defended here.

character of his experiences.[14]

We can avoid such worries by focusing instead on a case in which two individuals are differently sized throughout their lives and live in different, isolated communities populated by beings among whom they are normally sized. Brad Thompson (2010) has recently discussed just such a scenario. He describes a planet called "Doubled Earth", a perfect replica of Earth except that the planet and all its inhabitants are doubled in size relative to Earth. To make certain points vivid I shall consider an otherwise identical case in which one planet is ten times larger than the other, but this makes no real difference to the argument. Given that the inhabitants have all lived their entire lives on their respective planets there seems no reason to say of either community that their perceptions of size are systematically illusory; choosing one population rather than the other would seem unacceptably arbitrary. I shall take it, then, that the subjects under discussion perceive veridically in all of the cases to be discussed (which is not to say that they are immune from illusions; but no illusions occur in the cases under discussion). Consider an individual from each community; call the larger one 'Max' and the smaller one 'Min'. Max and Min are qualitatively very similar apart from the fact that Max is ten times larger than Min. Their environments are duplicates in all visible respects except for differing in size by a factor of ten. Not everything will scale down straightforwardly, of course; in some respects the world behaves very differently on a smaller scale. Liquids, for example, will seem a little different; a droplet of water would be as large compared to an ant-sized person as a football is to a human, and an ant-sized person would be able to pick up a droplet and carry it (as, apparently, ants do). But we can suppose that Min is much larger than an ant and will notice these differences less. In any case, if necessary, we can restrict attention to visual experiences and imagine regions of the respective environments (regions containing just solid objects, for example) such that if photographs were taken of those regions it would be impossible to tell which was which. When surveying the corresponding scenes from the corresponding locations in

[14] An analogous issue is discussed by Ned Block (1990, 1995) in the first phase of his "Inverted Earth" thought experiment, where a colour-inverted subject in transported to a colour-inverted and colour-language-inverted environment. Block then makes a similar move to the one that follows by considering a population of congenital colour-inverts. The kind of case discussed below, and by Thompson (2010), can be thought of as a spatial analogue of Block's Inverted Earth argument.

their respective environments the pattern of retinal stimulation would be exactly the same for both Max and Min.

Let us also suppose that Max and Min's causal powers are scaled in an appropriate way. For example, all else being equal, Min can lift items one tenth the size and weight that Max can lift. Similarly if an object is within reach for Max then an object one tenth as far away will be within reach for Min. Min can run one tenth as far as Max in a given period of time, and so on. Not everything will scale down precisely, but this won't matter for the argument. Finally we should imagine Min's brain functioning in much the same way as Max's brain. This may require differences in the physical constitutions of their brains. Perhaps, for example, Min's brain contains a silicon chip that can carry out the same information processing as Max's brain while fitting easily inside Min's head. Or perhaps Max's brain is very small compared to Max's head, so that there is room in Min's head for a brain the same size as Max's. Alternatively we could consider a far-off world where the physics of that world allows a precisely scaled-down duplicate; but we needn't go to such far-off worlds for the argument to work.[15]

Max and Min are both equally at home in their respective environments. Min lives in a house the size of a doll's house but does not find it at all cramped. Min can only walk one tenth as far as Max, but only needs to walk one tenth as far to reach the corresponding destinations. Min would not be able to lift Max's suitcase or drive Max's car, but has no difficulty with the corresponding operations in Min's own environment. And so on.

There are two scenarios to consider:

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[15] See Gould 1977, chapter 21, for arguments that miniature duplicates would never evolve in the actual world because of scaling differences (I am grateful to an anonymous referee for drawing my attention to this chapter). Perhaps, however, something near enough to a duplicate might evolve even in a nomologically possible world if gravity and other factors differed between environments in suitable ways (perhaps Min's planet is very dense and therefore has stronger gravity than Max's planet, for example). In any case, the argument that follows only requires that there be a *logically* possible world containing scaled duplicates such as Max and Min. Moreover, the main argument will still go through provided there can be creatures with experiences of differing phenomenal character yet the same representational content (as in scenario 2, below); and this does not require Max and Min to be perfect duplicates. Even if it were argued that creatures of different sizes could never have experiences with the same phenomenal character as one another, the main arguments, and the position to be defended here, would not be affected (only the discussion of scenario 1, below, would be affected; but this is not essential to the overall position).

Scenario 1: Corresponding trees. Max looks at a tree; Min stands in the corresponding location in the miniaturized world and looks at the corresponding tree. Max's tree is therefore ten times as big as Min's tree, and ten times as far way from Max as Min's tree is from Min. Since everything is precisely scaled, Max and Min's patterns of retinal stimulation are identical.

By stipulation neither Max nor Min has any visual impairment. As discussed above, there is no plausible reason to think that inhabitants of one planet perceive spatial properties veridically while the inhabitants of the other planet do not; so Max and Min's perceptions are veridical. Consequently their perceptions represent their respective environments as they are: if spatial properties are represented, Max's tree is represented as being ten times as big, and ten times as far away, as Min's. The visual angle subtended by the tree is the same in each case, however.

In describing an equivalent scenario Thompson assumes that both subjects would enjoy experiences with the same phenomenal character; and I agree. This is certainly how most people imagine Scott Carey; if he had been unconscious during the shrinking process and had woken in a miniaturized environment it seems plausible that at first he would not realize that he had shrunk; only when he encountered giant-seeming spiders or discovered the altered tactile behaviour of certain kinds of matter would he start to suspect that something was amiss. Even after discovering that he had shrunk, there would be no sudden change in how his environment looked to him. I shall take it, then, that in scenario 1 Max and Min's experiences share the same phenomenal character. This is also what one should think if one holds that phenomenal character supervenes on brain state (or at least on brain state defined in functional terms), assuming that Max and Min's brains remain in identical functional states throughout.

Consequently in scenario 1 there is sameness of phenomenal character between Max and Min but differences in the represented sizes and distances of objects. Thompson takes this as sufficient to show that any intentionalist theory according to which the relevant element of spatial phenomenal content consists entirely of spatial properties is false. He does not, however, discuss Tye's view concerning visual angles; for all that has been said so far it could be claimed that the phenomenal content of

Max and Min's experiences in scenario 1 includes the identical visual angles subtended by the trees, but not their differing sizes or distances.[16]

An appeal to visual angle alone would not work, however, for sameness of visual angle does not entail sameness of phenomenology. If it did, it is unclear how there could be any perception of depth; there would be no phenomenological difference between looking at a three-dimensional scene and looking at a two-dimensional photograph of the same scene. This can be further illustrated by the "corridor illusion" depicted in countless images in the psychological literature, an example of which is shown in figure 1.[17] Trees A and B subtend the same visual angle, yet because of the depth cues created by the converging lines and gradients tree A is most naturally seen as being smaller and closer than tree B. This is associated with a difference in phenomenal character; the two trees look different, in that one looks small and close while the other looks large and distant.[18] So there can be a difference in phenomenal character even though the same visual angle is represented.

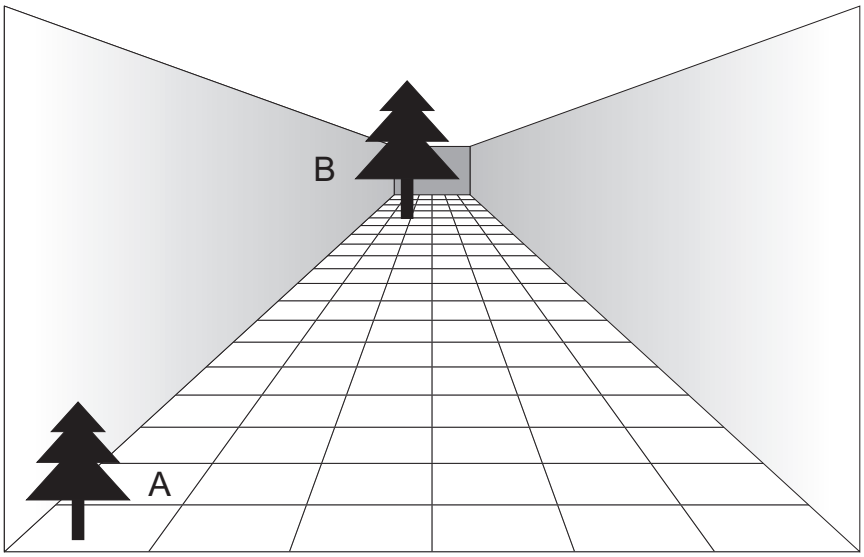

Figure 1: The Corridor Illusion

[16] It's not clear that Tye was suggesting that visual angle *alone* exhausts spatial phenomenal content. But given that sizes and distances are ruled out by scenario 1 it is not clear that there remain any other purely spatial contents to appeal to.

[17] The well-known Ames Room illusion (Ittelson 1952) also provides an analogous genuinely three-dimensional example that illustrates the same point, showing that nothing here turns on the interpretation of two-dimensional images.

[18] Another example: A star and a speck of dust floating in the air, illuminated by sunlight, might subtend indistinguishable visual angles; yet one appears *close* while the other appears *distant*.

With this in mind, consider a further scenario:

Scenario 2: Identical trees. Max and Min are transported to the same planet (or one of them is taken to the other's planet) where, upon arrival, they stand side-by-side looking at the very same scene, which includes a small tree. They see the same tree from the same distance, and it thus subtends the same visual angle for both of them.

We can assume that Max and Min's experiences continue to be veridical. Consequently each subject's experience represents a tree of the same size at the same distance, subtending the same visual angle. Yet the experiences differ in phenomenal character: to Max the tree looks *small* and *near* whereas to Min the tree appears *large*, and *far away* (at any rate, these italicized expressions provide a natural way to describe the phenomenological difference, and plausibly the way the subjects would describe their own experiences; I shall say more about this below). In case this is not obvious, it can be argued for as follows. In scenario 1 Max and Min's experiences have the same phenomenal character while they look at different-sized objects at different distances. For each of them, individually, different-sized objects at different distances subtending the same visual angle are experienced with different phenomenal characters, as described above with regard to figure 1. It follows that Max and Min will have experiences with different phenomenal characters when looking at objects of the same size at the same distance, and therefore the same visual angle, as in scenario 2. Consequently, scenarios 1 and 2 make it clear that spatial phenomenal content is not made up of purely spatial properties such as sizes, distances or visual angles.

It is instructive to consider how Max and Min would describe their experiences. Let us suppose that Max and Min's communities each speak identical languages with the sole exception that the extensions of size-related terms such as *big* and *small* and spatial indexical terms such as *near* and *far* are scaled in the same way as the speakers' respective environments. Thus when Max and Min each describe an object as *small* and *near*, all else being equal, Max's object is ten times larger and further away than Min's. But these spatial terms have the same role in Max and Min's lives. An object that Max describes as *near* is exactly as easy for Max to walk to, or to reach out and touch, as an object that Min describes as *near* is for Min (again, all else being equal);

and so on, for *far*, *big*, *small*, etc. I suggest that the elements of experiences that are naturally described using these words represent affordances; relations between the subject and the environment that depend on the causal powers of the subject, and in some cases the causal powers of the perceived object (unless spatial location counts as part of an object's causal powers then presumably the causal powers of an object are irrelevant to whether it looks *near* or *far*; but since size is relevant to causal powers, the size of an object, and thus an aspect of its causal powers, is relevant to whether it looks *big* or *small*). Whatever Max's environment affords to Max, Min's correspondingly scaled environment affords the same to Min. In scenario 1 Max and Min would describe their respective trees using exactly the same words; in scenario 2 they would describe the same tree, at the same distance, using different words; for Max it is *small* and *near* whereas for Min it is *large*, and *far away*. Given that these words play the same roles in Max and Min's lives, it seems plausible that the phenomenology will match up in the same way.

Some further issues concerning depth perception should be dealt with before moving on. Consider again the unfortunate Scott Carey fighting the seemingly giant spider. There are two factors, unrelated to those discussed above, that might be thought to play a role in accounting for the spider's apparently huge size, both of which, I shall argue, are red herrings. Firstly, because Carey is now so much smaller his eyes are much lower than they were before. Consequently he now has to look up at objects at which he had previously looked down – the spider now towers over him whereas previously he towered over the spider. We can avoid any corresponding effects in scenario 2 by stipulating that things are arranged such that Max and Min's eyes are both at the same height. But in any case, it is simply not true that objects look bigger from lower down (try crouching down – the angles will change, but the objects around you will not appear bigger). Secondly, because Carey is smaller he now tends to get closer to small objects. When he fights the spider his eyes are located, say, one centimeter from the spider; yet prior to shrinking he would not normally have observed a spider from so close (even if his eyes could have focused at that distance). Consequently the spider now subtends a much larger visual angle than it would have done before, and this might contribute to its seeming enormity. In scenario 2, however, there is no such effect. Max and Min both survey identical trees from

identical distances, so the visual angles are the same; yet there is still a phenomenological difference.

We should also consider the role of three other phenomena involved in depth perception: *stereopsis*, *accommodation* and *convergence*. I shall argue that insofar as these phenomena contribute to a representational difference between Max and Min this should be seen as a difference in represented affordances, not in represented spatial properties.

Firstly, then, consider *stereopsis*. An object that is close enough to the subject's eyes projects different images onto the different retinas. This is known as *retinal disparity* or *binocular disparity*, and provides an important source of information about depth. Stereopsis is the perception of depth through retinal disparity. Within its optimum range stereopsis allows very accurate depth perception, especially of relative depth; for example it is possible to judge, through stereopsis, which of two objects is one millimeter closer when viewed at a distance of around one meter. Consequently if Max and Min were each to look at an identical object at a distance of, say, thirty centimeters, there would be a significant difference in retinal disparity between them due to their differently spaced eyes. In that case although in both cases the object would subtend the same visual angle *as seen from a point* there might nonetheless be differences in what they would see, and thus represent; Max might see a little further *around* the object, for example, and Max's experience would thus represent slightly more of the surface of the object than Min's experience. Moreover there might be further retinal disparities due to the way in which the perceived object lined up with objects in the background, and thus further representational differences between Max and Min.

But stereopsis is only significant for objects seen at relatively close range. In scenario 2 we can suppose that the tree is far enough away that stereopsis is insignificant without it having to be far enough away to make it hard to judge its distance. Note also that some of the effects mentioned above disappear when there is no visible background and an object that only presents a relatively flat front surface with no possibility of seeing "around" it, yet there can still be depth perception in such circumstances.

Accommodation concerns the fact that in order to perceive an object one's eyes must

be focused, and the amount by which they must be focused provides information about the distance from the eyes to the observed object. Consequently the relevant muscular contraction provides information that could potentially be used in depth perception. This information is very limited, however. When focused at any more than a few meters away the muscles that focus the eyes assume their most relaxed state; so at best this source of depth perception could only work with objects nearby. Moreover it has been shown that even when looking at objects within the immediate vicinity accommodation is fairly inaccurate as a source of depth perception (Heinemann, Tulving and Nachmias 1959; Leibowitz and Moore 1966; Künnapas 1968; Wallach and Floor 1971). In any case, we can once again assume that scenario 2 is set up such that the tree is too far away for accommodation to have a direct role in Max or Min's perception of its distance.

Finally, *Convergence* concerns the fact that in binocular vision in order for both eyes to point at the same location they must converge by an angle that depends on the distance to the perceived object and the distance between the eyes. The relevant muscular contraction provides information with potential for use in depth perception, but this is very limited. For normal human beings the angle of convergence becomes undetectably close to zero for objects further than about six meters away, so convergence has no role in depth perception beyond those distances; though it has been shown to be a more reliable depth cue than accommodation for distances of less than six meters in the absence of other depth information (von Hofson 1976).

What all this shows is that stereopsis, accommodation and convergence play no *direct* role in Max and Min's distance perception when looking at the relatively distant tree in scenario 2. The phenomenological difference between Max and Min is not triggered by seeing the tree from a different height, feeling different muscular contractions when focusing or converging, or anything of that sort. In any case, even if these phenomena did play a direct role it is not clear that this would bring about a difference in represented spatial properties. For, by hypothesis, Max and Min's perceptions are properly calibrated relative to the operation of these phenomena, such that they contribute to *veridical* perceptions of distances, sizes etc. Consequently the result should be that Max and Min's perceptions represent the same spatial properties in scenario 2, insofar as they represent spatial properties at all.

A question arises, however: given that Max and Min are indistinguishable with respect to retinal stimulation, stereopsis, accommodation, convergence etc. in scenario 2, what *does* give rise to the difference in their phenomenology (and, if I am right, the difference in represented affordances)? There are many different factors that can determine perceived depth. There are, for example, many monocular depth cues such as the apparent convergence of parallel lines leading into the distance, textures and texture gradients, shading and assumed sizes of familiar objects that can be used in perceiving depth with reasonable accuracy, even through one eye. Many of these trade on implicit assumptions about the typical layout of the subject's environment.[19] But in scenario 2 these would be unlikely to account for any difference between Max and Min, because Max and Min's patterns of retinal stimulation are identical. Suppose that in Scenario 2 Min has been transported to Max's planet. Then, if all other factors were eliminated, the depth cues just listed might initially fool Min into thinking that the tree was *small* and *close* by Min's standards (whereas, by Min's standards, it would really be *large* and *far away*). In such a case Min would be subject to an illusion, and might in fact have experiences with the same phenomenal character as Max's experiences.

But we have stipulated that there is no illusion in scenario 2. There are various ways in which illusion can be avoided. Suppose that Min is transported to Max's planet and allowed to explore for a few minutes before being placed in scenario 2. Before moving, Min might be subject to a size illusion. But as soon as Min started to move around it would become apparent that things were much larger and more distant than their familiar forms would suggest. At this point, I suggest, the illusion would be broken and Min would undergo a kind of aspect switch. A comparable aspect switch can be experienced when looking at tree B in figure 1; it can be seen as large and distant, but it can also be seen as identical in size to tree A, hovering in the air at the entrance to the corridor.

Perhaps, alternatively, although the tree in scenario 2 is beyond the range of stereopsis, accommodation and convergence, there might be parts of the environment containing objects within range of these abilities. Min might therefore be able to

[19] For a useful survey of the mechanisms of depth perception in binocular and monocular vision see Blake and Sekuler 2006, chapter 8.

correctly judge the size and distance of nearby objects, and in doing so Min's overall experiences would become calibrated such that the tree would be seen as *large* and *far away*. I am not suggesting that the tree would be represented in Min's experiences as having properties such as being *five hundred times as far as my closest focusing distance* and in Max's experience as being *fifty times as far as my closest focusing distance*. Strictly speaking, these are relations involving the subject's causal powers and would therefore count as affordances. However it seems far more plausible that stereopsis, accommodation and convergence have only an indirect, calibrating role as described above, and that *large*, *small*, *near*, *far away* etc. have a far wider significance for the subject's actions, rather than merely representing a function of focusing distances etc.

One final possibility might be raised: that Max and Min's experiences represent the sizes and distances of objects by reference to the sizes of their own bodies. In some cases this has some plausibility; when one looks at a narrow doorway one can see whether or not one can fit through it, for example, and one can often see whether an object is *within reach* (which depends in part on the length of one's arms). Since the causal powers of a body depend in part on its size and shape then to represent relations to the subject's own body size and shape would still be to represent affordances of a kind. But body size cannot be the whole story. When one looks at one's own body, it has an apparent size. But *this* size cannot merely be perceptually represented in relation to one's body; for this would fail to explain why one's body – and with it, the whole world whose size is supposedly judged relative to it – appears phenomenologically *that* size rather than appearing, say, twice as big.

6. Affordances and phenomenal character

To summarize the position we have reached: Thompson is quite right that examples such as "Doubled Earth" or Max and Min show that spatial phenomenal content does not consist in spatial properties such as sizes and distances. Neither, we have seen, can it consist entirely in visual angles (though I've said nothing to suggest that these are not represented at all). Consequently, unless further purely extensional candidates for spatial phenomenal content can be found, standard Russellian versions of

intentionalism cannot be correct; at least, not without recourse to phenomenal externalism. A phenomenal externalist could of course insist that Max and Min's experiences share the same phenomenal character when observing scenes with identical spatial properties. This would have the odd consequence that, necessarily, the population of Min's miniature planet would see both their environment and their own bodies as small, though this would make no difference to their behaviour (relative to their respective environments) compared to the corresponding inhabitants of Max's planet. This strikes me as implausible, though of course hard to disprove. As explained, above, however, my aim here is chiefly to provide an alternative reductive theory rather than to attack phenomenal externalism head-on.

I shall say more about the Fregean intentionalism that Thompson advocates in response to his "Doubled Earth" argument below. In the meantime I shall say a little more about the affordances that I suggest at least partially constitute phenomenal content (I say "*partially* constitute" to allow that experience might also represent certain non-Twin-Earth-able properties, if there are any, as well as affordances). I have suggested that when Max and Min both describe an object as looking *near* (in their local languages) their experiences both represent the object as having the same affordance – that is, as standing in the same relation to the perceiving subject. It is hard to give a more specific characterization of the relation in question without oversimplifying. If an object is *near*, for example, then this has a very complex significance for the subject's actions. It is within reach, but also a short or easy journey away, or within range of thrown rocks, and so on. I take it to be an empirical matter to determine the precise characterization of the affordances represented in perception. Moreover an environment may afford different things to creatures with different kinds of physiologies.[20] Since a major function of perception is to guide action, it seems unlikely that the connection between represented affordances and phenomenal

[20] Thompson's (2010) example of *El Greco world*, containing vertically stretched beings looking at vertically stretched objects, is illustrative of this. The inhabitants' causal powers are adjusted to match their stretched environment. In their environment vertical ovals behave the way circles behave on Earth. When they see vertical ovals, their experiences have the same phenomenal character that ours have when we see circles. Thompson takes El Greco world as further evidence against standard Russellian intentionalism; it shows that represented shapes do not fix phenomenal character. I agree, but I think the example also suggests a strong tie between the subject's capacities to act relative to their environment and the phenomenal character of their experiences of that environment. The same world would look different to us than to the inhabitants of El Greco world entirely because of the differences in our causal powers. Circles afford us what vertical ovals afford them.

character is a coincidence. Our environment looks to us the way it has to in order to guide our actions in the right way.[21]

The affordances involved in the phenomenal content of spatial perception may be of a general kind that has no essential connection with space. Consider a subject who has always been wired up to a computer-generated virtual reality environment, perhaps like the familiar brain-in-a-vat or the characters depicted in the film *The Matrix*; or, if such things are possible, a being who wholly exists in a computer environment. I accept the standard assumption that such a subject can have experiences identical in phenomenal character to those of an ordinary human. What should we say about the representational contents of such a person's experiences?

If intentionalism is correct then, if the phenomenal character is the same, the phenomenal content should be the same; so the affordances that comprise phenomenal content should be the same in the virtual reality case as in the normal spatial case. But if these affordances have any essentially spatial component then presumably the affordance content would be false in the virtual reality case. Perhaps this is so; it would not create any problems for the theory described above. But I lean toward an alternative view according to which a subject who has *always* inhabited the virtual environment has largely veridical perceptions of the virtual environment (albeit with some radically false beliefs about their connection to that environment).[22]

This view can easily be accommodated if the notion of an affordance is understood in a sufficiently general way. The virtual reality subject would describe parts of the virtual environment as looking *near*, *far*, *large*, *small* etc. These expressions would have a significance for the subject's actions precisely parallel to their significance for the actions of normal humans. An object that is *near* will typically be *within reach*, for example (except that "reaching" in the virtual environment does not involve the spatial extending of a limb, but an isomorphic equivalent). An object that is *far* will take more time and effort to travel to than one that is *near* (except that "travelling" does not literally involve motion in the virtual environment but, again, an isomorphic

[21] The idea that egocentric relations such as *near* and *to the left* have an essential connection to the subject's behaviour is not, of course, a new one. See for example Gareth Evans's (1985) discussion of egocentric space as "behavioral space".

[22] The notion that a virtual reality brain-in-a-vat has largely veridical mental states that concern its computer environment goes back at least to Davidson (attributed to Davidson by Rorty in a footnote in Rorty 1989); but for a recent defense of this idea with respect to spatial content see Chalmers 2003.

equivalent). The subject's body "size" still has a corresponding significance in terms of fitting through "doorways", and so on, but this has nothing to do with body *size* because the subject's virtual body has no genuine size at all, but does has something isomorphic. And so on.

Consequently the affordances that constitute phenomenal content should be thought of as general, multiply realizable subject-environment relations common to all such cases. The actions mentioned in describing an affordance must be individuated in a coarse-grained way such that, for example, walking, reaching and lifting in the ordinary sense count as actions of the same type as their virtual reality equivalents. The phenomenal character of a veridical experience, by representing an affordance of this general kind, thus narrows down the possibilities for ways in which the subject and environment can causally interact; but it does not, in itself, entail very much about the intrinsic nature of either the subject or the environment.

I have so far discussed only cases in which the subject's perceptions and actions are correctly harmonized. In those cases where perception and action are out of harmony, misperception will result. If, for example, the subject is unaware of wearing left-right inverting goggles then an object may look *to the left* (as the subject would put it) but the subject will reach for it in the wrong direction (the subject reaches to the left, but the object is really to the right). The object thus did not have the affordance represented by the subject's experience (it was not, for example, touchable by reaching out in that way). Those who are broadly sympathetic to a consumer semantics (Millikan 1989), as I am, will hold that the behaviour that typically results from a perception – the way in which the perception is consumed – has a constitutive role in determining the content of the perception. The way that the representation is consumed trumps the causal history of its production. If a perceptual state is normally consumed such that the subject reaches to the left, then it represents the object as being to the left (though I shall not attempt to say what counts as "normal" here). On this kind of view, then, a mismatch between perception and action is constitutive of misrepresentation; and although I do not think that consumer semantics straightforwardly entails the view that I am advocating, they do seem to be natural partners. But we probably do not have to accept a consumer semantics to accept the view; an "indicator" semantics will still associate mistaken actions with misperceptions, though the relation is not such a

close one.

7. An empirical objection?

At this point an empirical objection should be dealt with. It has recently been claimed that human perceptual processing divides into two major streams associated with the dorsal (parietal) and ventral (temporal) regions of the brain, and that while the ventral stream is largely responsible for conscious perceptual awareness the dorsal stream has a significant role in perceptually-guided action (see Goodale and Milner 1992; Goodale and Humphrey 1998). Moreover, it has been suggested that processing in these two streams can sometimes diverge in content. One major piece of evidence for this concerns subjects' responses to the well-known Ebbinghaus illusion, an example of which is shown in figure 2. When asked about the relative sizes of the two dark grey central circles most subjects report that the one on the right looks larger than the one on the left. When asked to grasp the central circles, however, subjects' grasping responses are identical for both circles. This has been taken to suggest that while the subject's conscious perceptual awareness via the ventral stream is fooled by the illusion the action-guiding dorsal stream is not.

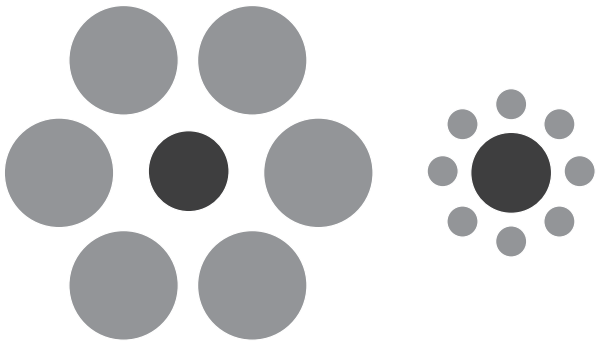

Figure 2: The Ebbinghaus illusion

If this is correct then the following objection might be raised: given that the perception of affordances is supposed to be essentially connected to the guidance of action then

insofar as affordances are perceived these are detected in the dorsal stream rather than the ventral stream. Consequently they are not represented in conscious awareness, as this depends on the contents of the ventral stream. This conclusion, however, seems too hasty. As a matter of fact the results of the original experiments on the Ebbinghaus illusion have been challenged by more recent work (see Franz 2003; Franz, Scharnowski and Gegenfurtner 2005; Gilster, Kuhtz-Buschbeck, Wiesner and Ferstl 2006). Still, the Ebbinghaus illusion is not the only evidence for the hypothesis of separate pathways for conscious perception and action. So let us assume, just for the sake of argument, that the original experiments were correct. This does not threaten the claim that affordances are represented in conscious perception; at most, it only shows that the affordances represented in one stream sometimes (though rarely) diverge from those represented in the other stream, and that some of the specific details of motor control turn out to be determined by the affordances represented in the stream that does not lead to conscious experience. It would certainly be an exaggeration to say that it had been shown that ventral processing has nothing to do with action. It would be hard to deny that the way things consciously look makes a difference to which actions the subject decides to perform; and the perceived affordances are likely to be crucial in this. One may or may not decide to walk to a place depending on how *far* it looks, for example.

There is, in any case, some empirical evidence that supports the claim that affordances are represented in conscious (not merely unconscious) experience. Evidence regarding the perception of affordances can be divided into two categories: what people *do* in certain circumstances (grasping the Ebbinghaus circles, for example), and what people *say* about their experiences (saying that the Ebbinghaus circles appear to be of different sizes, for example). In the Ebbinghaus case the former is taken as evidence for the contents of the dorsal ("action") stream whereas the latter is taken as evidence for the contents of the ventral ("perception") stream, and of visual consciousness. Over the last twenty years or so a large number of experiments have been performed on the perception of various kinds of affordances such as affordances for the "climbability" of stairs (Warren, 1984), sitting on objects (Mark, 1987; Mark, Bailliet, Craver, Douglas, & Fox, 1990), passing through apertures (Warren & Whang, 1987), reaching (Carello, Grosofsky, Reichel, Solomon, & Turvey, 1989), reaching

with jumping (Pepping and Li 2000), and catching (Oudejans, Michaels, Bakker, & Dolné, 1996)(this list is not exhaustive). These studies have revealed that perceptual judgments of whether the environment affords the action in question vary systematically with subject-relative properties such as leg-length to stair-size ratio (for climbability of stairs), yielding largely accurate perceptual judgments of which actions are possible for the subject, albeit with some systematic errors in certain circumstances. Many of the studies proceed by asking subjects to make verbal judgments, though see also Pepping and Li 2005 for a comparison of both kinds of evidence – verbal and action – for the same task. If we make the same association between consciousness and reportability implicit in the interpretation of the Ebbinghaus illusion experiments, these studies all suggest that affordances *can* be detected though conscious perception and are not involved merely in the guidance of non-verbal action by a sub-conscious dorsal stream.

It is also worth mentioning some recent research suggesting that even relatively short-term alterations to a subject's causal powers can make a difference to their judgments of spatial properties. It was shown some time ago that people consistently overestimate the steepness of slopes (Proffitt et al. 1995). Subsequent experiments suggest that this effect is increased when the subject wears a heavy backpack (see Bhalla and Proffitt 1999; though note that their interpretation of the experiment has been questioned by Durgin et al. 2009). This might be taken to suggest that the subject's perception-based judgment is altered in an appropriate way according to the degree of effort that they think would be required to ascend the slope; and this seems at least consistent with the view that the subject perceives affordances. Of even more interest are recent experiments that suggest that a subject carrying a heavy load, or whose estimation of the effort required to travel has been manipulated such that it seems to them to require more effort, will make an increased estimate of the perceived distance to a place to which they are about to travel (see Proffitt et al. 2003, where an explicitly Gibsonian and neo-Berkelian conclusion in terms of affordances is drawn). Further experiments (Witt, Proffitt and Epstein 2004) suggest that perceptual judgments about affordances are influenced by what kind of action the subject intends to perform; for example, estimates of egocentric distance increase with the weight of an object that is to be thrown to the perceived location, but only when the subject

intends to throw it.

We should be careful not to draw a hasty conclusion from these experiments. For one thing, they concern only *actual* subjects, and therefore cannot show a *necessary* connection between the representation of affordances and phenomenal character. For another thing, the data gathered in these experiments consists in the verbal reports of the experimental subjects. This leaves it unclear whether it is the subject's perceptual states that are affected by the various experimental conditions or, instead, the judgments that they make, based on those states. The results thus seem consistent with claims that the experimental conditions affect the perceptual states, the judgments, or a mixture of the two. Perhaps further investigation could make one of these interpretations more plausible than the others. For now, we can at least say that these experiments are suggestive, and are at least consistent with a correlation between represented affordances and phenomenal character in the actual world.[23]

8. Comparison with the Fregean and centered-worlds approaches

To help put the view that I am advocating into perspective it may be helpful to compare it in more detail to two other phenomenal internalist theories: the Fregean approach of Chalmers (2004) and Thompson (2007, 2010), outlined above, and Egan's (2006) version of the Appearance Properties approach (although Shoemaker originated the Appearance Properties approach, I shall not discuss his own versions of the view as I feel that they are superseded by Egan's view, for the reasons that Egan gives; see also Thompson 2007 for further objections to Shoemaker).

The Fregean view holds that in addition to a wide Russellian content, perceptual content includes a mode of presentation of that content. Modes of presentation are "conditions on extension", as Chalmers (2004) puts it, or ways in which an extension is determined. Another way to think of them is as functions from centered worlds to extensions (a centered world is a possible world with a time, individual and/or place marked as the "center". For these purposes the center is understood as locating the

[23] I am grateful to an anonymous referee for help with several aspects of my discussion in the last two paragraphs.

perceiving subject within a world. For further details see Quine 1969, Lewis 1979.) Or, finally, they can be thought of as primary intensions in a two-dimensional semantics of the kind developed by Chalmers (1996). The same extension may be determined by different modes of presentation in different centered worlds. For example, *my mother*, with me in the actual world as center, determines the same extension as *my daughter*, with my grandmother in the actual world as center. A mode of presentation thus construed is a narrow content, but determines a wide content for a given centered world.

The examples of perceptual modes of presentation given by Chalmers and Thompson invariably include an unanalyzed reference to a phenomenal character. Consider, for example, the phenomenal character of the experience that you, the reader, have when you look at something green. Call this phenomenal character *G*. Then according to both Chalmers and Thompson, assuming that colours are objective properties, the Fregean mode of presentation of the colour green in your experience will be something like *the property that typically causes experiences with phenomenal character G in me* (this will typically be combined with a mode of presentation of an object to yield a complete, truth-evaluable content). This allows for the possibility that the same colour may typically cause experiences with different phenomenal characters in different subjects, or different colours may typically cause experiences with the same phenomenal character in different subjects; the colour that typically causes experiences with phenomenal character *G* in me might be different from the colour property that typically causes experiences with phenomenal character *G* in you. The same mode of presentation can thus determine different Russellian contents, and different modes of presentation can determine the same Russellian contents. According to Chalmers and Thompson the Fregean mode of presentation thus construed comprises the phenomenal content of the experience.

Similarly, consider a spatial phenomenal character *S* associated with the perception of a spatial property; according to Thompson its mode of presentation, and thus the relevant component of phenomenal content, will be something like *the property that typically causes experiences with phenomenal character S in me* (see Thompson 2010, 174-5). So, for example, Max and Min's experiences could share this phenomenal content while differing in wide spatial content (which handles scenario 1); or their experiences could

share the same wide spatial content while differing in phenomenal content (which handles scenario 2).

Fregean modes of presentation, thus construed, necessarily correlate with phenomenal character. Of course they do; the reference to the phenomenal character in the specification of the mode of presentation more or less guarantees the correlation. The price of this is that it renders the theory non-reductive. To reduce phenomenal character to representational content is to say what phenomenal character is in terms of representational content. It must be possible to specify the relevant representational content in terms that make no reference to phenomenal character, otherwise one would be explaining phenomenal character in terms of itself. Consequently, as Chalmers (2004) puts it, his view is "naturally seen as a sort of nonreductive representationalism, as phenomenal notions are used in specifying the relevant Fregean contents". The theory that I have advocated, by contrast, is reductive, in that affordances can in principle be specified without using phenomenal notions (though in principle one could also accept my proposal for phenomenal content yet not accept reduction; more on this below).

Egan's view has much in common with the Fregean view. The main difference is that Egan rejects the "two-layer" Fregean account, opting for a phenomenal content that consists of appearance properties (which are ascribed to objects in complete truth-evaluable contents). These are not modes of presentation of Russellian contents, though they do count as an extra layer of content insofar as spatial properties are also represented (Egan does not go into much detail about the latter, however). Egan's candidates for appearance properties are specific examples of what he calls *centering features*. These, he says, are to centered worlds what properties are to possible worlds; properties are functions from worlds to extensions, whereas centering features are functions from centered worlds to extensions. For an object to possess a centering feature is for it to be related to the center in some specific way. *Being two meters away from me* thus counts as a centering feature; an object possesses it in every centered world in which the subject at the center is two meters away from the object.

Egan discusses colour experience, rather than spatial experience. His proposal (2006, 513) is that in a colour experience an object is represented as either *being disposed to cause G experiences in me* or *presently causing a G experience in me*, where '*G*' again stands for

a specific phenomenal character (the italicized phrases stand for centering features). He leaves it open which of these candidates is correct, though he gives more emphasis to discussion of the first. It is clear that this proposal is close to the Fregean one, and that because of the explicit reference to the phenomenal character ('*G*') in the specification of the phenomenal content, Egan's candidate for phenomenal content will correlate with phenomenal character just as well as its Fregean equivalent. For the same reason, his view is non-reductive.[24]

Although Egan does cite *being nearby* as an example of a centering feature, he does not suggest that this is an appearance property. Neither does he give any details about the semantics of *near* (see Egan 2006, footnote 37). By parallel with what he says about colour perception, though, we should expect the appearance property associated with a spatial phenomenal character *S* to be along the lines of *being disposed to cause S experiences in me* (or, on the alternative formulation, *presently causing an S experience in me*). At any rate, Egan says nothing to suggest that spatial appearance properties are of a different kind to colour appearance properties, so I shall assume that the above example captures what his theory would say about spatial appearance properties; crucially, that the unanalyzed reference to a phenomenal character remains in place in the spatial case.

Strictly speaking, one might count the centering features that Egan discusses as limiting cases of affordances; colour phenomenal character inverts differ in their causal relation to colours, for example, just in that the same colour causes different experiences in them. But the presence of these features has no direct significance for the subject's behaviour. Given this, and the non-reductive nature of Egan's theory, it is clear that his centering features are importantly different from the affordances discussed above.

One way to bring out the difference between the theories just described and the theory that I advocate is to consider how an experience narrows down the possible situations that the subject could be in if the experience is veridical. All three theories are centered worlds theories; they agree that the phenomenal content of an experience can be thought of as a set of centered worlds (not just possible worlds) consistent with

[24] See Egan 2006, footnote 22 on non-reductive intentionalist theories. I am not suggesting that the centering feature view is non-reductive *per se*, but Egan's own examples of phenomenal contents are all non-reductive.

the experience.[25] In itself, the phenomenal character of one's veridical experience of a tree that is *small* and *near*, for example, is consistent with one being a person like Max looking at a ten-meter tree twenty meters away, or a person like Min looking at a one-meter tree two meters away, and so on. Egan describes such subject-relative situations as *predicaments*; Max and Min, as just described, are in the same predicament. All three theories can agree on this, whereas a Russellian theory does not.

Where the three theories differ most importantly is in whether they are reductive and, relatedly, the degree to which a given phenomenal character narrows the range of predicaments. The non-reductive theories of Chalmers, Thompson and Egan agree on this; they differ only regarding the relation between phenomenal contents and Russellian contents. The affordance theory, by contrast, is committed to a greater narrowing of the possible predicaments for a given phenomenal character. Consider, for example, the much-discussed cases of inverting goggles, which make the world appear up side down to the wearer. It is consistent with the theories of Chalmers, Thompson and Egan that there be two subjects who do not differ functionally but whose veridical perceptions of the same scene have phenomenal characters that differ in the way in which the experiences of a single subject differ immediately before and after putting on inverting goggles – the phenomenal character of one subject's experience is identical to the phenomenal character the other subject's experience would have if everything were turned up side down. An advocate of one of these theories might wish to rule out such a possibility because of *other* theoretical commitments (they might independently hold a functional role account of phenomenal character, for example); but there is nothing in the theories themselves that would rule this out.[26]

By contrast, the affordance theory does rule out such cases. When subjects first wear inverting goggles the world looks up side down, and they have difficulty coordinating their actions with their perceptions. But, after a period of adjustment,

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[25] To put that another way: all three theories agree that an object looks the way it does to me not because of the properties it has, but because of the relation in which I stand to it (or, rather, my perceptual representations thereof). If you stood in the same relation to it, it would look the same to you – the identity of the subject is not part of the phenomenal content.

[26] Strictly speaking the inverting goggles case does not test for the behavioral roles of the *near*, *far*, *large*, *small* etc. phenomenal characters relevant to the Max-Min case, but only for the *up* and *down* phenomenal characters. Nonetheless I think it very plausible that what goes for the one case goes for the other.

they are able to co-ordinate much better. Suppose a subject were able to compensate perfectly, so that the effects of spatial perception on their actions became just as they were prior to wearing the goggles; they would then be functionally equivalent to the way they were originally. Would the subject's phenomenology revert to the way it was prior to wearing the goggles, implying that phenomenology maps onto functional role, or would the experiences continue to have an "up side down" phenomenal character?[27] Suppose the latter were true. Then presumably there could be a planet populated by subjects who lived their entire lives in that same phenomenologically "inverted" state, and whose perceptions would be generally veridical. But if the affordance theory is true then a difference of phenomenal character entails a difference in represented affordances. Since the "inverted" subjects would be functionally equivalent – and thus equivalent in causal powers – to non-inverted subjects, then the represented affordances would have to be the same, given that the perceptions were veridical. So the affordance theory is not consistent with this kind of inversion scenario. Consequently the non-reductive theories allow that a given spatial phenomenal character is consistent with two kinds of predicament (the inverted and non-inverted cases) where the affordance theory allows only one. According to the non-reductive theories a given phenomenal character, in itself, only represents the presence of whatever typically causes experiences of that phenomenal character; according to the affordance theory, by contrast, a given phenomenal character essentially represents a finer-grained, action-relevant relation between the subject and the perceived world.

The kind of inversion scenario just described is thus important in determining which kind of intentionalist theory one should adopt. If one holds that such inversions are possible then only the non-reductive views will give a sufficiently loose fit between phenomenal character and the perceived objective world. But if one rules out such inversions – presumably because one holds that a phenomenal character has its functional role essentially – then one can accept the stronger claims of the affordance theory. Debates over the functional roles of phenomenal characters are, of course, long-standing, and I cannot hope to settle them here. What I do hope to have shown, however, is that for those who are prepared to accept that phenomenal characters

[27] See Dennett 1988, 1991, Morgan 1977 and Evans 1985 for discussions of such cases.

have their functional roles essentially there is an option that has hitherto been neglected in the intentionalist literature, one that allows both phenomenal internalism and the reduction of phenomenal character to representational content. For a significant number of philosophers, this will be an attractive package. Only those who reject a tight connection between phenomenal character and functional role need reject the affordance theory. Given the common assumption that representation is essentially a causal notion (involving causal covariance with the environment, or something of that kind) then this conclusion should not be unexpected; divorcing phenomenal character from functional (and thus causal) role is bound to sever any essential connection between a phenomenal character and a specific, substantive representational content.

Advocates of theories such as those of Chalmers, Thompson and Egan can still adopt a *kind* of reductionism by type-identifying the phenomenal characters that figure in modes of presentation with physical or functional states.[28] But, of course, the antecedent reduction of phenomenal characters to physical or functional states is doing all the work; this would not be an *interesting* reduction of phenomenal character to representational content. It is worth emphasizing that the affordance theory is not that kind of theory. It is not, for example, equivalent to the theory obtained from Egan's theory by substituting phenomenal character for functional role, yielding a phenomenal content such as *the property that typically causes states with functional role F in me*. Perhaps an argument might be given that this phenomenal content entails an affordance, though this argument would be far from straightforward. In any case, in itself, the proposed phenomenal content is uninformative; it is hard to see what a creature would gain from a perceptual experience that represented an object as having *the property that typically causes experiences with functional role F in me*. Yet it is perfectly clear what a creature would gain from having perceptual experiences that represented affordances, given that the affordances of the creature's environment are precisely the subject-environment relations that the creature would need to be aware of in order to negotiate that environment. I take this to be a significant strength of the affordance theory over non-reductive theories; it allows for a naturalistic explanation of why a phenomenal character represents what it does.

[28] In Prosser 2007 I put forward a view of very roughly this kind.

The affordance theory can of course be accepted by a functionalist (for whom a given functional role is both necessary and sufficient for a given phenomenal character). But it can also be accepted by someone who rejects a reduction of phenomenal character to functional role, provided they accept that phenomenal characters have their functional roles essentially. This includes some versions of materialism and some versions of property dualism (the latter would reject a reduction of phenomenal character to representational content, but could still accept a necessary correlation). This would not be true if the affordance theory were equivalent to the theory obtained from the combination of Egan's theory or the Fregean theory with an antecedent reduction of phenomenal character to functional role.[29]

9. The multiple contents of perception

Although I claim that phenomenal content consists of affordances, I do not deny that we perceive spatial properties such as sizes and distances. It was noted above that different subjects can differ in how heavy an object feels to them (i.e. how hard it is for them to lift) yet both correctly judge its weight. This suggests that even if the phenomenal character of an experience of heaviness consists of an affordance, there is nonetheless a sense in which the experience constitutes a perception of weight. I suggest that something similar is true for spatial and other experiences.

One way to think of this is through a linguistic analogy. Consider the following utterance:

U: Jones is here

[29] Given that the affordance theory says that phenomenal content is made up of relations (rather than, say, modes of presentation), why not describe the theory as Russellian after all? The answer lies in the fact that in order for represented affordance relations to have the right significance for the actions of the perceiving subject, they have to be represented in a distinctively first person way (even if they involve no explicit, articulated representation of the first person, as described above in section 3). This is brought out by the fact that the relevant contents must be represented as sets of centered worlds (or perhaps, alternatively, as structured propositions in which an element of the structure is marked as having a special role equivalent to centering), rather than merely sets of possible worlds (or structured propositions with no indexical element). But I acknowledge that in comparison with the standard Fregean approach the view advocated here might be seen a step back in the direction of Russellian theories, albeit with an essentially indexical component added to the content. Of course one can, if one wishes, describe even the latter kind of view as Russellian; this is a purely terminological matter.

Many different propositions can be associated with U, corresponding to many different ways of stating its truth conditions (see Perry 1990, 2001 for elaborations of this idea in relation to Perry's notion of "incremental" truth-conditions). For example, if 'J' is another name for the person referred to by 'Jones', 'the φ' is a definite description true of J and associated with 'Jones' by the local linguistic community, and 'L' is a name for the place at which U was uttered, then the following are all ways of stating the way the world must be if U is true:

i) The uttered token of 'Jones is here' is true
ii) The φ is at the place where 'here' was uttered
iii) J is at location L

Each of these narrows down the possibilities for how the world in which U is uttered might turn out to be if U is true; but the propositions lower in the list rule out more possibilities than those higher in the list. Notice also, however, that the propositions lower in the list are more *modally fragile*, while those higher in the list are more *modally robust*. That is to say, if we consider what happens when we vary the world in which the utterance, U, occurs, we find that the propositions higher in the list remain associated with U across a greater range of worlds than those lower in the list. (iii), for example, no longer captures the truth conditions of U in worlds in which U is uttered in a different place, while (i) and (ii) still do so. However (ii) fails to capture the truth conditions for U in more distant worlds of utterance in which 'Jones' is not associated with 'the φ' or 'here' does not refer to the place of utterance. At the opposite extreme (i) captures a proposition associated with U in any world in which U is a meaningful utterance. (i) does not narrow down the possibilities very much, but it does still narrow them down; only worlds in which the words that compose U are related to the world in the right way for U to be true are not ruled out. So contents like (i) are the weakest (in terms of how many worlds they rule out), but the most modally robust. The fact that a content is modally fragile is not an objection to its being ascribed in the relevant worlds of utterance; (ii) and (iii) both give correct truth conditions for U provided we restrict attention to worlds in which 'Jones' and 'here' have their extensions

determined as the φ and the place of utterance respectively (for (ii)), or worlds in which 'Jones' refers to J and 'here' refers to L (for (iii)).

I suggest that a very similar pattern is present in the spatial contents of perception. An experience with a given phenomenal character has the same phenomenal content for all worlds and subjects. This content is modally robust, but relatively weak (in terms of how much it narrows down the possible predicaments consistent with the experience being veridical). If we restrict the domain of centered worlds that are taken as candidates for the centered world in which the experience occurs, however, then stronger, albeit more modally fragile contents can be ascribed.

Suppose, for example, that Max has a veridical visual experience of an object that looks, as Max would put it, fairly near, and is in fact ten meters away from Max. If we restrict the domain of subjects to include only beings constituted like Max, then an experience with that phenomenal character is veridical if and only if the perceived object is ten meters away. If, on the other hand, we restrict the domain to beings constituted like Min, then an experience with that same phenomenal character is veridical if and only if the object is one meter away. Provided the ascriptions are made only in contexts in which it is clear that the domain is restricted in the relevant ways, there is no obvious reason why we shouldn't say that Max's experience represents the object as being ten meters away, whereas Min's experience represents the object as being one meter away; even though both experiences can also be said to represent the object as having the same affordance for the subject. But it is usually only when we consider what is true of phenomenal character for all worlds and subjects, as we do when considering philosophical questions about the nature of conscious experience, that it becomes relevant to consider the latter, phenomenal content.

On one version of this view, a given token experience has many different contents at once, and these can be arranged in a hierarchy analogous to (i)-(iii). Our explanatory purposes then determine which of those contents is of interest to us at any given time (again, much like the linguistic case). Another, more instrumentalist version of the view would eschew talk of experiences *really* having many different contents at once, and instead hold that ascribing different contents is akin to describing the same situation in different ways, for different explanatory purposes. I shall remain neutral on which of these views is correct. In any case, the view advocated here does have in

common with the Fregean and Appearance Property views that it allows for different "layers" of content, wherein experiences can be said to have extensional contents distinct from their phenomenal contents, with a hierarchical relation between them.

10. Concluding remarks

I have argued for a version of intentionalism according to which for any perceptual experience with phenomenal character *P* there is a representational content *R*, at least partially consisting of affordances, such that necessarily, a conscious perceptual experience has *P* if and only if it has *R*. The necessity is of the strongest, logical kind. Consequently the view is consistent with the reduction of phenomenal character to representational content; and it is also consistent with phenomenal internalism.

Differences in intentionalist theories have tended to go together with differences in views about the metaphysics of consciousness. Phenomenal externalist views such as those of Tye and Dretske are usually materialistic, but since they deny mind-brain supervenience their theories are very different from materialistic theories that have gone before. Non-reductive phenomenal internalist theories, on the other hand, while compatible with materialism, have tended to be the theories of choice for anti-materialists. Their non-reductive nature is of no concern to those who did not expect a naturalistic reduction of phenomenal character anyway.

The view that I have advocated, by contrast, rejects phenomenal externalism while allowing (if not necessitating) a reduction of phenomenal character to representational content. Perhaps it can thus be thought of as the theory of choice for more conventional materialists, though it can be accepted by anyone who accepts that phenomenal characters have their functional roles essentially.[30]

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