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Infusing Perception with Imagination

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I defend the broad thesis:

PII: Most if not all perceptual experiences are infused with imagination.

The rough idea is that perceptual experiences often (perhaps always) receive input from the imagination; they are soaked with or infused with imaginings.¹ Although PII has some supporters, it is not a popular view.² We tend to think of what we experience in perception as being decided by what we look at, hear, et cetera in our environment. By contrast, if PII is true, a significant chunk of what we perceptually experience is decided, or “made up”, by us. PII is therefore counter to a basic supposition, and if true has important implications for our conception of perceptual experience and for perceptual epistemology. Independently of PII’s truth, we lack a framework for PII debates; we lack a conceptual space that draws together various contributions on the topic by clarifying ways in which to interpret, defend, and challenge PII. The other central aim of this work is to construct such a framework, in large part to orient and stimulate future debates about the role of imagination in perception.

Developing a framework for PII debates is complicated. There is no universally accepted characterization of imagination or of perception, and there are, independently of this, various ways of trying to inject the former into the latter. Furthermore, if PII is true, then the division between perception and imagination is far blurrier than typically supposed. My sympathetic approach to PII is in part genuine, and in part because

¹ This essay was originally submitted in September 2013. In the interim some relevant works have appeared, perhaps most notably Kind (2016a). I have endeavoured to update where appropriate. I am indebted to two anonymous referees for this volume, and to audiences at the ‘Perceptual Memory and Perceptual Imagination’ conference (University of Glasgow, 6–9 September 2011), the Western Canadian Philosophical Association conference (Winnipeg, 18–20 October 2013), the University of Antwerp (October 2016), and the University of York (November 2016). A special debt is owed to Fiona Macpherson, both for sparking my interest in the subject and for several penetrating discussions on the topic.

² Historical supporters of PII include Kant (1787/1997), Strawson (1970), and Sellars (1978). Contemporary works that defend some form of it include Pendlebury (1996), Lennon (2010), Nanay (2010), and Macpherson (2012). Briscoe (2011) is a recent critic.

charting the landscape of PII debates is more tractable when one makes efforts—perhaps to a fault—to be a PII-sympathizer. For ease of discussion I will focus on vision, and recommend caution when applying what follows to other modalities.

In what follows, I will speak of the *ingredients* or *contributions* to perceptual (and imaginative) experience, and the *elements* or *constituents* of perceptual experience. The former designates the relevant inputs to perceptual experience and the latter the constituents (perhaps obtained via some internal partitioning) of perceptual experience. Both are intended to be theory-neutral, schematic notions. Regarding the theory of perceptual experience, there is arguably a natural tension between PII and naïve realism, and no such obvious tension between PII and either sense-datum theory or representationalism. I will make passing remarks about these matters but in general will leave them to others to sort out. While there are some contexts in which it is legitimate to argue (e.g.) from naïve realism to the falsity of PII, or vice versa, this is not one of them.

The chapter proceeds as follows:

- Section 1: A sense of imagination useful for debates about PII is articulated and incorporated into a schematic guidance principle.
- Section 2: Strawson's (1970) defence of PII is outlined and evaluated. While the view rests on an interpretation of phenomena (object-sameness recognition and object-kind recognition) that deserves further scrutiny, the logic of the argument is compelling.
- Section 3: Macpherson's (2012) defence of PII is sketched. Its focus on a specific set of colour phenomena distinguishes it from Strawson's contribution and arguably places Macpherson's defence on stronger empirical footing. The overall argument structure utilized by each author is the same.
- Section 4: A defence of PII drawn from amodal completion and perceptual constancies is offered. The argument structure departs slightly from that employed in sections 2 and 3. The connection to computational approaches to vision is emphasized.
- Section 5: Concluding remarks are put forth.

1. Framing the Debate: Imagination as Self-Generated Contributions with Ampliative Effect

1.1 *False starts*

A seemingly intractable problem hounds our discussion: What is the relevant sense of imagination for evaluating PII? It is common to concede that there are many conceptions of imagination³ and at least not uncommon to avoid commitment to one of these being

³ The literature now contains various proposed taxonomies for imagination. They are outlined in Gendler's (2011) helpful SEP entry on the topic. For example Walton (1990) distinguishes between spontaneous and deliberate imaginings, occurrent and non-occurrent imaginings, and social and solitary ones. Currie and Ravenscroft (2002) distinguish between creative, sensory, and recreative imagination. We can

preferred above all others.⁴ To take but one helpful (and relevant) example, Strawson⁵ *begins* his defence of PII by articulating three conceptions of imagination that are tangential to his purposes, the phenomena: (1) of generating images in one's mind (e.g. as when one imagines one's favourite activity or location); (2) of being noticeably creative (e.g. as when one cleverly solves a problem); and (3) of having false beliefs or perceptions (e.g. "You're imagining things!"). These are three familiar and important senses of imagination, and given that Strawson's "primary concern . . . is not with any of these" (31), it behoves us to tread carefully in articulating what sense of imagination we *should* be primarily concerned with, to ensure both that we are fairly defending and critiquing PII.

There is no simple way through this problem, and one risks begging the question in either direction with any attempt to resolve the matter. Consider some examples. If one supposes that imagination must be under subject control or deliberate (call this *Imagination-as-Deliberate*), then PII is likely false.⁶ Setting aside direction of gaze and the like, various aspects of perception are not under subject control (e.g. what I see when I look in some direction is typically not deliberate in any relevant sense). Yet arguing from here to the conclusion that perceptions are not infused with imaginings seems illegitimate. Debates about PII are at least in large part over whether familiar, everyday non-deliberate perceptions are impacted by the imagination. Fortunately, *Imagination-as-Deliberate* is unacceptable in any case, for all experience imaginative episodes that are not deliberate (e.g. one's fear of going downstairs is reinforced by one uncontrollably imagining that a demon or murderer lies in wait). At best imaginings, more than perceptions, tend toward being deliberate.

One also begs the question against PII if one supposes that imaginings are unstable and fade rapidly (call this *Imagination-as-Fleeting*).⁷ Many perceptions exhibit considerable stability, particularly if the relevant parts of the world are stable, and so this constraint considerably narrows the window through which imagination might enter perception. Yet using this to conclude that perceptions are not infused with imaginings seems as illegitimate as using *Imagination-as-Deliberate*. Part of the point of PII is that we must explore whether imagination is utilized during not only familiar, everyday, non-deliberate perceptions, but also during stable perceptions. In addition, putting

also distinguish between propositional and non-propositional imaginings, where the latter include both objectual (Yablo 1993) and active imagining (Walton 1990). Different taxonomies are more useful for different purposes, depending (e.g.) on whether one is focused on distinguishing imagination from other mental states, examining the role of imagination in aesthetics, or exploring the connections between imagination and modality. My topic—the role of imagination in perception—demands a conception of imagination suitable to the task. I will adhere to the somewhat simplified picture in the text, and set aside its connections to these various other taxonomies. Doing otherwise would unfortunately be a significant distraction.

⁴ Walton (1990: 19) for example claims that he cannot isolate what the legitimate conceptions of imagination have in common. This sentiment is echoed in Kind's Introduction to the *Routledge Handbook of Philosophy of Imagination* when she notes that "many of the authors in this collection, explicitly refrain from even trying to [say what imagination is]" on grounds that the challenge has "proved remarkably difficult" (2016b: 1).

⁵ All references to Strawson are to his (1970).

⁶ For example, Briscoe's critique of PII in part rests on the assertion that "mental images are not obligatory" (2011: 165). This and the reference in the next paragraph are unfortunate weaknesses in a generally excellent article.

⁷ Briscoe (2011: 164) regrettably makes this mistake.

forth Imagination-as-Fleeting is suspect on its own. Some people have imaginings that are consistent and stable over several years of their lives, and are even communally available (e.g. imaginary friends or characters). At best imaginings, more than perceptions, tend toward being fleeting.

Similar reasoning applies to the Humean idea that imaginings are phenomenally less vivacious than perceptions (call this *Imagination-as-Faint*). In general this may be true, but if one allows dreams and hallucinations to be imaginings then there are many vivacious imaginings. There are also many “low energy” perceptual experiences (e.g. seeing in dim light, hearing very quiet or distal sounds, etc.) that lack the vivacity of “typical” perceptions. Independently of the criterion’s ability to distinguish perception from imagination, in theory PII may obtain even if perceptual experiences only contain their typical vivacious aspects. Imagination-as-Faint is unnecessarily restrictive.

To use these criteria to criticize PII is to fail to meet the challenge of PII directly. Various familiar conceptions of imagination, including ones that emphasize the deliberate or fleeting or faint character of some imaginings, are not of primary concern when assessing PII, and in any case there are legitimate conceptions of imagination that do not endorse these as universal constraints. We must be wary of attempts to tightly fix what imagination is in advance, but particularly cautious of biases those attempts might bring into our discussion, lest we run the risk of masking PII’s significance.

Relatedly, we can beg the question against PII’s opponents by offering an overly liberal conception of what might justify PII. For example one can view one’s yard and imagine how it would look with one’s garden arranged in various ways. One can view some pebbles and see—i.e. imagine—that their arrangement resembles a horse or a house. In such cases one arguably has a perception and adds an imagining to it, or perhaps has both and conjoins them. Such cases demand more than simultaneously having a perception and an imagining, they demand in addition that the two be experienced as in a common space and in particular in perceptual space. These are instances of what Briscoe calls “make-perceive”, and it is plausible that they obtain (2011: 154). However, if PII only required instances of make-perceive then it would hardly be controversial. PII must have more teeth than this. It must entail that some significant set of familiar, everyday perceptions are infused with imagination, regardless of whether or not one is engaged in make-perceive. Here is a way forward.

1.2 *The proposed schematic principle*

Kind (2001) characterizes imaginings as mental experiences that have directedness/intentionality, a phenomenology, and that are active (as opposed to passive). The first two features are straightforward enough for our purposes, imaginings will be about some (actual or possible) entity, property, or state of affairs, and will have a qualitative or phenomenal aspect.⁸ To illustrate the active/passive distinction Kind (90–2) points

⁸ Although I have some worries about the phenomenal criterion in general, I wish to grant it in what follows. The issue is largely tangential to my focus, since the discussion will soon shift from imaginings to imaginative contributions.

to the supposed difference between perception (passive) and imagination (active). In Kind's view imagination is active because it is something one *does*. Imagining requires an action on the part of an agent, it involves an output that is caused or generated by the subject doing the imagining. By contrast, for Kind perception is passive because perceptions consist of "receiving stuff" from the world, perceptions happen to us. To help clarify the passive character of perception she adds that although moving one's eyes and utilizing one's attention are actions of subjects, perception itself is wholly receptive.⁹ Kind further argues that *images* are the only ontological item that can plausibly satisfy these features of imagination. Images achieve directedness by being representational, they explain the centrality of phenomenology to imagination (since by hypothesis images are inherently phenomenal), and on her account the active nature of imagination derives from "image formation" (95). She thus concludes that images are central to the imagination.

Kind's account of imagination invokes none of Imagination-as-Deliberate,¹⁰ Imagination-as-Fleeting, nor Imagination-as-Faint. In this regard it is a significant step forward. Unfortunately, importing Kind's account into a discussion of PII yields challenges, regardless of its value for other venues. The most direct challenge emerges because on Kind's account perception and imagination are seemingly in opposition to one another. How can we assess PII if in our taxonomy perception is opposed to imagination? Here is a simple remedy: we distinguish perceptual and imaginative *experiences* on one hand from perceptual and imaginative *contributions* to an experience on the other. We embrace a conception of perception that in theory allows for *imaginative contributions* to perceptual experiences, and in a broader discussion (to be had elsewhere) a conception of imagination that in theory allows for *perceptual contributions* to imaginative experiences. No doubt vagueness will persist at the boundaries of these distinctions, but progress is still possible.

How should we characterize an imaginative contribution to a perceptual experience, and distinguish it from a perceptual contribution to that experience? My rough starting point is that imaginings are coming from within, the subject is "making them up"; perceptions are coming from without, the subject is "receiving them from the actual world". This is reasonably close to Kind's active/passive distinction. However, I propose two refinements. Imaginative contributions should be *self-generated*, items that are produced by the subject, as opposed to "given" to the subject by the world. Imaginative contributions should also add to or modify the resulting experience in some direct, tangible way. They must in this sense have *ampliative effect*. When these self-generated ingredients have ampliative effect, the effect should ideally be on the

⁹ "[W]hile attending to what I perceive is something that I *do*, the perceiving itself is not" (92). This conception of perception is arguably hostile to enactive approaches to perception, which roughly seek to characterize perceptions (including perceptual experiences) in terms of the actions perceptual systems facilitate for perceivers. I unfortunately cannot examine this issue here.

¹⁰ To say that imaginings are actions of agents is not to say that they are deliberate actions (Kind 2001: 91).

phenomenal and directed aspects of the resulting perceptual experience. This yields a helpful guidance principle:

PII guidance principle (Principle): A perceptual experience is infused with imagination if and only if the experience arises in part from self-generated ingredients that have ampliative effect on its phenomenal and directed elements.¹¹

Principle is a schema in that concrete proposals for its core notions (e.g. ‘self-generated’, ‘ampliative’) are needed to assess it. That said, its content, including its schematic nature, can aid PII discussions. A few remarks are in order.

1.3 Discussion of principle

Principle embodies a conception of imaginative contributions that does not give images the central place they occupy in Kind’s account of imagination. Images are needed in Kind’s account to recover the phenomenal and directed aspects of imaginative states. But if perceptions are infused with imaginings, then images are not needed for this role, for perceptions already have phenomenal and directed aspects. Instead, if there is a self-generated contribution that has ampliative effect on the phenomenal and directed aspects of perceptual experiences, then a capacity known to be able to achieve this—imagination—should be inferred. If in these instances imagination achieves this by placing images into perceptual experiences then so be it, but that it must do so through images seems prejudicial. Put another way, in examining PII we should shift from talking about imagination proper to talking about imaginative contributions to perceptual experiences, and one consequence of this is that mental images (as typically conceived in imagination studies) are set aside in favour of perceptual experiences and the potentially ampliative effect self-generated ingredients can have on them.

My proposal in many ways captures the spirit of Kant’s famous remarks on our topic.¹² Imagination is not merely “limited to reproduction”, it has the potential to generate not previously perceived elements (e.g. Hume’s missing shade of blue) and beyond this to contribute to experience in fundamentally different ways than can a merely reproductive faculty (discussed below). On the other side, perceptions are not “merely receptive” but emerge through “synthesizing” what the senses receive with additional material. Imagination is what fills this gap, it adds the ingredients to

¹¹ This idea is not intended to straightforwardly apply to other issues in perception, e.g. the nature of illusions or hallucinations. It is intended to facilitate discussion of PII. I presume debates about how to understand illusions and hallucinations are to some extent intertwined with debates about PII, a connection I cannot delve into.

¹² “Psychologists have hitherto failed to realise that imagination is a necessary ingredient of perception itself. This is due partly to the fact that the faculty [imagination] has been limited to reproduction, partly to the belief that the senses not only supply impressions but also combine them so as to generate images of objects. For that purpose something more than mere receptivity of the senses is undoubtedly required, namely, a function for the synthesis of them” (*Critique of Pure Reason*, A120, fn.). What follows in the text is not intended to illuminate Kant scholarship but instead to extract insights from these remarks for our discussion. For a recent and worthwhile work of Kant scholarship on the topic, see Matherne (2015).

perception that go beyond what is received from the world. Since PII is true such ingredients are not merely occasional but omnipresent, imagination is a “necessary ingredient of perception”. Kant’s commitment to perception involving “images of objects” is perhaps where Principle most significantly diverges from the Kantian picture (cf. previous paragraph), though Kant scholars can better assess the matter. Regardless, Principle is broadly a reformulation of Kant’s vision.¹³

Is Principle too liberal? Not at this point. Principle is extracted from reputable conceptions of imagination via reasonable steps. As such it is appropriately focused. Importantly, Principle is a schema whose worth emerges from analysing its proposed instances. Principle does not show us how to find self-generated contributions to the phenomenology and directedness of perceptions that have ampliative effect. Its purpose is to *guide* those efforts. I should, however, make explicit my bias. Those, like me, interested in pushing PII as far as we can, will naturally grant considerable flexibility in our conception of imagination and of perception, if only to see where it takes us.

To be upfront, here is how some key issues unfold. The proposed conception of imaginative contributions not only safely avoids Imagination-as-Deliberate/-Fleeting/-Faint. In addition, because imaginative contributions are explicated in terms of self-generation and ampliative effect, there is no antecedent commitment to imaginative contributions consisting of or being caused by cognitive states, being unlearned/“hardwired”, being universal (as opposed to highly contextual) or being readily discernible. Consider two examples.

Some (e.g. Briscoe 2011 and perhaps Nanay 2016) hold that imaginative contributions to perception must be “top-down” perceptual effects (call this *Top-down Constraint*). Although there is intuitive value to such a constraint, by deeming imaginative contributions to be self-generated with ampliative effect we leave this constraint open to discussion. That is, a self-generated ingredient needs to come from the subject (as opposed to being received from the world), but it doesn’t by necessity have to derive from any particular location within the subject let alone from high-level cognition. If we have good reason to postulate ampliative perceptual effects deriving from the subject then those effects stem from imaginative contributions to perception, even if we discover that they do not arise from top-down processing.¹⁴ Stated more broadly,

¹³ The reader may wish to contrast the Kantian *synthesis* approach with the Humean *conjunctive* one. Strawson characterizes the difference nicely: “Hume seems to think of the operations of the imagination as something superadded to actual occurrent perceptions, the latter having a quite determinate character independent of and unaffected by the imagination’s operations . . . The Kantian synthesis, on the other hand, however conceived, is something necessarily involved in, a necessary condition of, actual occurrent reportable perceptions having the character they do have” (1970: 42).

¹⁴ I will suppress specifics regarding the neural correlates of perception and of imagination and their impact on PII debates. To some this may seem prejudicial. I hope that what follows will go some distance toward overcoming this charge. For the interested reader here is some guidance. Current evidence supports excessive overlap between imaginative and perceptual regions of activation (see Kosslyn et al. 2006 for an overview, and Nanay 2010 and Briscoe 2011 for astute philosophical analyses). For example, in a series of PET studies in which neural activations were observed during imaginative and perceptual activities, fourteen of twenty-one measured areas were active during both activities (Kosslyn et al. 2006: 157). Of the

we must be careful not to conflate issues about the infusion of perception with imagination with issues about the penetration of perception by cognition (i.e. *cognitive penetration*¹⁵). I am focused on the former, and wish to be clear that whatever aid cognitive penetration can provide to a defence of PII is welcome, but any challenges to cognitive penetration that can be dissociated from a defence of PII must be recognized as such, for the two need not fall together. This topic will be revisited throughout.

In addition, the idea that imaginative contributions must have ampliative effect leaves open what it takes to discern such effects. It may be that the effects are subtle and only emerge through well designed and executed psychophysical experiments, the commitments of our best theory, and so on. Importantly, there is no commitment to ampliative effects being readily identifiable to naïve subjects—subjects need not be able to pick out the perceptual and the imaginative elements of their experience. For example, what is from the subject’s perspective a distinct element of her experience, say a perceptually experienced colour, may after analysis be something that emerged through both imaginative and perceptual contributions (see section 3). It follows that the experienced colour is infused with imagination (quite literally), and it is difficult for the subject (and perhaps also the experimenters) to tease out the imaginative and perceptual contributions to that colour precisely because the infusion is so seamless in experience. Since this kind of phenomenon will be relevant to what follows, for ease of reference I will call it *seamless infusion*.

What follows is a sketch of three means of defending PII. The cases are of differing strengths, overlap in important ways, and each is undoubtedly defeasible. One thing they share is an overall strategy: each is an attempt to assess PII by bringing the above conceptual guidance to bear on key perceptual phenomena and on contemporary perceptual theory. The cases each utilize a similar argument form that derives from Strawson’s wonderful essay. The value of Strawson’s contribution is by no means restricted to this argument form, but that form is arguably more critical to the present work than the perceptual phenomena to which Strawson applies it (i.e. object-sameness and object-kind recognition, see section 2). Part of the reason for this is that Macpherson (perhaps unknowingly) utilizes the same argument form but applies it to

remaining, two were only active during perceptual and five only during imagining. In fMRI studies overlap was about 92 percent (159), and in frontal regions “the spatial pattern of activation was identical” (160). Strong differences were found only in posterior regions. They report similar findings in lesion studies. This considerable overlap provides at least prima facie evidence in favour of PII. However, if one for example imposes Top-down Constraint on PII, then this overlap is consistent with the falsity of PII (I leave these details to the reader). One confounding factor is that in standard experiments of this sort subjects are asked to imagine something (e.g. “now picture __ in your mind”) or perform tasks that are well known to engage the imagination (e.g. mental rotation tasks). This is done in part because these are uncontroversial instances of imaginative employment, and are largely under subject control and thus easy to utilize in experiments. The difficulty is that, as Strawson rightly asserts, the conception of imagination relevant to PII is not confined to standard cases of the “now picture __ in your mind” sort. Thus, results from such experiments can only indirectly impact PII debates in any case.

¹⁵ Recent work defending cognitive penetration includes Macpherson (2012), Stokes (2012), and Wu (2013). I will treat ‘cognitive penetration’ and ‘top-down perceptual effects’ as synonymous.

a different phenomenon (an intriguing set of colour perceptions, see section 3). In her case the phenomenon, though controversial, has received extensive empirical scrutiny. The phenomena central to the final case are amodal completion and perceptual constancies (section 4). Part of the interest in these cases is that an argument for PII can be articulated without cognition occupying the overtly central role it occupies in the arguments in sections 2 and 3. Top-down Constraint is considered in each case.

2. Object-Sameness/-Kind and Strawson

There is much to learn from Strawson's 'Imagination and Perception'. It is a subtle mix of historical comparison (between Hume, Kant, and Wittgenstein), historical interpretation (particularly of Kantian philosophy and its contemporary interest), and contains several interesting arguments for PII that stand on their own, independently of their connection to these great figures. Strawson's own view derives from Kant.¹⁶ Important as the historical connections are, I have elected to focus only on a portion of the piece that can be neatly excised and incorporated into my discussion.

2.1 Outline of Strawson

Strawson proposes that the imagination is invoked during perceptions to (a) recognize an object as of some particular kind, he throughout uses the example of "recognizing the strange dog I see as a dog", and to (b) recognize an object as the same at different times (1970: 33). For ease of reference call these *object-kind recognition* and *object-sameness recognition*, and presume their coherence for the moment. Here is my reconstruction of his argument for the role of imagination in object-sameness recognition. It contains adequate generality to appreciate how he defends object-kind recognition.

Strawson claims that, against Hume, we do not perceptually experience sequences of fleeting sensations. Instead we often perceptually have experiences of "an enduring object of some kind" (38).¹⁷ The endurance or persistence of a thing over time does not only come from thoughts or reasoning about perceptions, but often comes from perceptions themselves. This is thus a perceptual datum that needs explanation, that object-sameness can be inherent to a perceptual experience. Call it *perceptual object-sameness*. For example, "[c]ompare seeing a face you *think* you know, but cannot associate with any previous encounter, with seeing a face you *know* you know and can very well so associate, even though there does not, as you see it, occur any particular *episode* of recalling any particular previous encounter" (40). These are experiences we

¹⁶ To some (e.g. Pendlebury 1996) Kant's point was that the synthesis imagination helps perform occurs *preconceptually*. Since Strawson's defence of PII relies heavily on concepts, Strawson's view might not be Kantian to at least these Kant scholars. As mentioned in section 1, I will sidestep issues pertaining to Kant scholarship.

¹⁷ Strawson does not mean that as a matter of fact we at times perceive the same object, which most take to be trivially true. He means that by hypothesis our experiences themselves are imbued with the sameness of the object (whether or not the same object is in fact perceived).

have all had. The thought is not that someone you've previously seen *will* subsequently be familiar to you. It is that some faces are experienced as familiar while others are not, and that this is not explained merely by appeal to memories. Instead it is at least in part an inherently perceptual phenomenon.

The problem is that, according to Hume, Kant, and Strawson, perceptual object-sameness cannot be coming from the objective world: a thing's identity over time is not something it straightforwardly advertises to our perceptual systems; and perceptual object-sameness can occur when viewing something that is in fact unfamiliar. Strawson proposes a two-step solution.

The "beginnings of an answer [is that it is] concepts of distinct and enduring objects" that facilitate this, they "*link* different perceptions as perceptions of the *same* object" (38). Concepts are stored, independent contents that can persist independently of and across perceptions. But they alone are inadequate. Merely applying concepts to perceived objects sounds like having thoughts about those objects, not injecting object-sameness into perceptions. What we additionally need is some means of utilizing these concepts to generate "*other* actual or possible perceptions" and bring them into "the *present* perception" (40). Perceptual object-sameness involves perceptual experiences that are "soaked with, or animated by, or infused with" what Strawson calls *nonactual perceptions* (41).¹⁸ How might this occur?

We require some means of explaining how conceptual stores of past or possible perceptions might get not merely activated, but into the right *form* to infect occurrent perceptions. It is here that Strawson appeals to the imagination, for it has the capacity and function of "producing actual representatives (in the shape of images) of nonactual perceptions" (41). It is a *quasi-perceptual* character that concept applications lack and imaginings provide. "May we not, then, find a kinship between the capacity for [this] kind of exercise of the imagination and the capacity which is exercised in actual perception of the kind we are concerned with? Kant, at least, is prepared to register his sense of such a kinship by extending the title of 'imagination' to cover both capacities" (41).

One may wonder whether it is not merely the quasi-perceptual character of imagination that is being invoked, but images proper. Strawson has the former in mind: "[i]t is not . . . by being represented by actual images, that nonactual (past or possible) perceptions enter into actual perception" (44). Perceptual object-sameness has a quasi-perceptual character, but that character need not be strictly contained in images. In at least this sense the object-sameness that is perceptually experienced need not straightforwardly be dissociable from the perceptual experience of the object itself. It is less like conjoining a perceptual experience of the object with a mental image of a past or possible perception of the object, and more like a single unified experience of the object as the same as an object of a past or possible perception.

¹⁸ If the experience is veridical then the relevant nonactual perception is a past perception of the object; if non-veridical then the relevant nonactual perception is merely a possible perception of the object.

2.2 Evaluation of Strawson

Strawson's argument fits nicely with the account outlined in section 1, for Strawson recognizes: that the relevant idea for defending PII is that of imaginative contributions as opposed to the more familiar images or imaginings (or cognitions); that what is essential to such contributions being deemed imaginative is that they be self-generated and have ampliative effect (e.g. there is no appeal to Imagination-as-Deliberate/-Fleeting/-Faint); and for such contributions to infuse perceptual experience they must be part of the phenomenology and directedness of such experience. With Kant, Strawson is departing from the idea that imagination is merely reproductive. Instead imagination contributes past or possible perceptions to occurrent perceptions and thereby helps imbue the latter with a sense of endurance or object-sameness. However, there is still much for critics to wonder about. Here are some examples.

1. *How does infusion work?* Some kind of proposed infusion of the present with the past/possible is a good starting point, but a detailed account is not provided. This leaves important questions about the proposed infusion unanswered. How are these imaginative contributions (i.e. past/possible perceptions) and perceptual contributions (i.e. present perceptions) interwoven in the *processes leading up* to a perceptual experience that is infused with imaginings? How are the past/possible and present elements related *in experience*? For example, when having an experience of a familiar face, how are the imaginative and perceptual capacities working together to yield this experience, and how are the *familiar* and *face* aspects related in that experience? The latter issue for example is relevant to assessing whether or not *seamless infusion* occurs on Strawson's account. In Strawson's defence other proposals (discussed below) also provide few details about how to answer these kinds of questions. Resolving this challenge requires delving into theories of perceptual experience. This is a difficult matter that I cannot venture into, but surely one that comprehensive discussions of PII must traverse.

2. *What is the scope of the infusion?* How universal is this infusion of perception with imagination, to what extent do perceptual object-kind and object-sameness occur? I believe the imaginative infusion is near universal for Strawson. But critics may take issue with this, particularly if, to use Strawson's terminology, the infusion is tied to *recognizing* or *seeing as p* (a dog, brown, familiar, etc.). It is common to distinguish between *seeing x* and *seeing x as p*. There are many options for interpreting *seeing-as*, but few of them collapse the distinction. In agreement with Strawson it is also reasonable to hold that some invocations of *seeing-as* often utilize stored representations derived from past or possible perceptions. Somewhat ironically, the distinction itself—between *seeing x* and *seeing x as p*—generates difficulties for Strawson, for the distinction can be taken to imply that there is a sense of perceiving—seeing a brown thing—that is basic and does not involve the *seeing-as* function. The *seeing-as* function then becomes potentially nonperceptual and available for use by Strawson's opponent. Indeed, few would doubt that we can apply concepts via a *seeing-as* function to what is

perceived, while recognizing that doing so leaves open the question of whether or not that application is itself perceptual.

Strawson himself offers an uncompromising response: “seeing as... is present in perception in general” (47). As I read him, *seeing x* does not generally if ever occur without *seeing x as p*, at least as he uses these terms. The distinction carves out different aspects simultaneously present in typical experiences, and hence there is no threat of *seeing x* forcing *seeing x as p* into the nonperceptual domain. I see no concise way to adjudicate this disagreement, for matters become complicated as authors articulate different senses of *seeing-as* and different ways of carving the *seeing x/seeing x as p* distinction. I conclude that Strawson’s intention is to defend the (near) universality of the infusion of perception by imagination, and that his grounds for this wide scope are *prima facie* defensible, though controversial.

3. *Is perception conceptualized?* What exactly is the connection between concepts on one hand, and imaginings and perceptions on the other? Although concepts “link” perceptions, it is unclear how to interpret this. I am unable to offer a full picture. However, one important issue is whether perception is conceptualized or not, and I think Strawson can stay neutral on the matter. On my reconstruction it is the *quasi-perceptual* character of imagination that is needed to explain perceptual object-sameness (and that by hypothesis cognition lacks). Thus, concepts are free to variously relate to perceptions: (1) concepts might stay clear of perceptions but be relevant by triggering the quasi-perceptual imagination into action; (2) concepts might enter into (and conceptualize) perceptions, but in addition trigger imagination into action. Once one accepts that what needs explanation is an aspect of perceptual experience, and that the application of concepts alone lacks a perceptual character, one recognizes a gap that is naturally filled by imagination. In turn, filling this gap by imagination leads us to query the role of concepts in the first place, which yields either (1) or (2) (or whatever). The explanation of perceptual object-sameness does not require deciding the matter. However, (1) is particularly important for it allows those who are so inclined to, strictly speaking, keep concepts out of perceptions. On this view, to the extent that concepts affect perceptions they do so indirectly, by giving rise to imaginings. As with the previous paragraphs, this issue becomes complicated when one delves into various conceptions of concepts or introduces nonconceptual content into the discussion.

4. *The phenomena beg the question.* Perhaps most substantively, the PII sceptic might reject the phenomena—perceptual object-sameness and object-kind—which imagination is invoked to help explain, in favour of a narrower view of perceptual experience, say one according to which those experiences themselves are fleeting disconnected states of the Humean sort. On such a view the experience one has of a familiar object is not wholly a perceptual experience. The experience of the object is perceptual, but the experience of the familiar quality is nonperceptual (e.g. cognitive, even imaginative). Regardless of any scepticism toward PII, the phenomena of perceptual object-sameness and perceptual object-kind are in need of clarification. Here are some pertinent issues.

Regarding perceptual object-kind, does Strawson intend the phenomenon to apply only to high-level properties (he gives as examples seeing something as a dog or as a tree) or can it apply also to low-level properties (e.g. seeing something as blue or as round)? The matter is important because some wish to keep high-level properties out of perception (see e.g. Siegel 2006 for an argument to the contrary). Strawson himself doesn't make the distinction between high- and low-level properties, but it is coherent to apply perceptual object-kind to low-level properties and there is no discernible impact on using these applications to assess his argument. Even so, experiencing blue and experiencing something as blue (i.e. as a particular instantiating the kind BLUE) are plausibly distinct. Strawson's critic may grant the former yet resist the latter, and the latter is required for Strawson's argument.

Perceptual object-sameness involves experiencing some x as the same as some y , for example experiencing some face as the same as some past/possibly experienced face. Are there any constraints on how x and y are related? Need the faces have the same features (e.g. eye colour, shape), can the past/possible experience of the face be from a moment ago or need there be more temporal lag, and so on? Regarding temporal lag, of relevance is the contemporary psychological distinction between iconic memory, perceptual short-term memory, and perceptual long-term memory. Again, Strawson himself doesn't make these distinctions, but it is coherent to apply perceptual object-sameness and Strawson's argument to any temporal duration and to entities that do not have the same features (e.g. shape or colour). However, it is unclear how to assess the result.

These and related issues (e.g. how does Strawson's use of the term 'recognition' map onto contemporary psychological notions like identification, recognition, and discrimination?) make it difficult to adjudicate Strawson's argument. In my judgement, although the matter is quite messy at least some forms of object-sameness and object-kind recognition are genuinely perceptual, and thus Strawson's cases have compelling instances. However, given that my primary interest is in his proposed argument form, I ask the reader to be flexible and invite future discussions to analyse the matter more thoroughly.

5. *Is Strawson committed to Top-down Constraint?* On the surface the answer is "yes" because Strawson is invoking concepts as a trigger for imaginative contributions to perception. This is a straightforward form of cognitive penetration. However, this assessment may be overly anachronistic. By today's standards Strawson's phenomena (perceptual object-sameness and object-kind) are underspecified in ways that intersect with Top-down Constraint, and it isn't clear how his notion of concepts fits into various contemporary models. On one reading, Strawson doesn't care whether or not his defence of PII commits him to Top-down Constraint. That constraint is connected to a view about early and late visual processing that wasn't dominant in 1970, and so it would be odd to commit Strawson to it. On this reading, if there is something in early vision that can goad imagination into generating past/possible perceptions, and a capacity to blend these with current perceptions, Strawson would be fine rejecting Top-down Constraint.

I wish to conclude this selective discussion of Strawson in a positive tone. Critics may question his chosen phenomena (perceptual object-sameness and object-kind), and may reject his assertion that *seeing-as* is a general constraint on perception. Regardless, Strawson's model for defending PII is important. Concept application alone does not have a perceptual character. Thus, if there are aspects of perceptual experience that cannot be explained by reference to what is received from the occurrent objective world, then, if concepts are invoked in one's explanation they alone are inadequate. Something with an inherently quasi-perceptual character is essential, and imagination is an obvious candidate. This general model is not confined to perceptual object-sameness or object-kind, but can be applied to various phenomena for testing. Indeed the idea that cognitions indirectly affect perceptions by triggering imaginings *has* been recently applied to colour phenomena—with great success.

3. Colour and Macpherson

Macpherson's (2012) focus is on defending cognitive penetration as opposed to PII. However, her defence of cognitive penetration contains an argument for PII, making the work directly relevant.

3.1 *Outline of Macpherson*

A key source of evidence Macpherson offers for cognitive penetration is results from Delk and Fillenbaum (1965) and subsequent reconfirmations and extensions of their experimental paradigm.¹⁹ For ease of reference call all such results *De&F* (Delk & Fillenbaum) results. Roughly, the experimental set-up involved red *cut-outs* placed before a background *sheet*. Some cut-outs were of characteristically red things (e.g. an apple, a love-heart shape, lips), some were not (e.g. an oval, a square). The sheet could be varied from yellow to orange to red. Wax paper was placed in front of both to somewhat blur boundaries between the two. Subjects were asked to match the sheet to each cut-out by manipulating the former. Perhaps surprisingly, subjects made the sheet more red when the cut-out was of a characteristic red object than they did when the cut-out was of a non-characteristic red object. By hypothesis subjects accurately report in both cases that, post-manipulation, the cut-out perceptually matches the sheet. Why would the difference obtain? Macpherson's answer (following Delk and Fillenbaum) is that the cognitive association of redness with the cut-out of a characteristically red thing is making those cut-outs appear more red than cut-outs of non-characteristically red things. Thus to match the former subjects have to make the sheet more red than they do to match the latter.

In a similar set-up, a more recent and stunning case found that subjects made the sheet darker when behind grey-scale images of faces with features stereotypical of

¹⁹ See Macpherson (2012) for details. Another useful source is Olkkonen et al. (2012). I presume the results are legitimate, though recognize that some are sceptical of them (e.g. Firestone and Scholl 2015).

black people (e.g. wider nose, larger lips), than they did when behind images with features stereotypical of white people (e.g. narrower nose, narrower lips), despite the images having the same surface luminance (Levin and Banaji 2006). The effect is so powerful that in uncontrolled settings viewers of these images attest to experiencing the stereotypically black-featured images as darker than the stereotypically white-featured ones (a sample is reprinted in Macpherson 2012: 49). Macpherson proposes the same explanation: the cognitive association of features with skin colour skews perceptual experience.

It is reasonable to assume that the biases found in D&F results are learned as opposed to innate—they should not be thought of as stemming from hardwired, systemic assumptions of our perceptual systems. It is also reasonable to hold that, as Macpherson argues, these biases cannot be fully explained by appeal to nonperceptual cognitive states (e.g. beliefs about these colour–feature associations) or attentional effects (e.g. the features of the stimuli subjects are attending to or “highlighting”). Subjects’ beliefs can vary, for example by telling them what is going on in the experiment and giving them evidence for their own potential bias, and their perceptual biases do not disappear. Subjects can attend to different parts of the stimuli and perceptual biases remain. Our best hypothesis is that these biases manifest themselves in perception—that this is a genuine phenomenon of perceptual experience.

Since the effects found in D&F results appeal to learned, long-term, stored colour–feature associations (e.g. love-heart shapes are red), it is difficult to explain them by appeal to iconic memory or perceptual short-term memory.²⁰ Instead perceptual long-term memory is the likely culprit. This, combined with the D&F results indicating a genuine perceptual phenomenon, is why cognitive penetration is postulated.

In slightly more detail, Macpherson proposes a two-stage mechanism for how cognition effects perception. One “involves our cognitive states causing some nonperceptual state with phenomenal character to come into existence or to alter the phenomenal character of some existing nonperceptual state that has phenomenal character” (50). She offers several examples that are independently plausible, including imagining something following a request to do so, and dreaming of someone a few hours after first meeting. The second stage “involves the phenomenal character of these nonperceptual states interacting with and affecting the phenomenal character and content of perceptual experiences” (51). This she regards independently plausible because of the Perky effect,²¹ the presence of external stimuli in dreams (e.g. hearing one’s currently sounding alarm clock in one’s current dream), and hallucinations in which the hallucinated entities are experienced as integrated with the veridical parts of one’s perceptual experience (e.g. experiencing a hallucinated person as being in the room in which one is now situated). Macpherson argues that both steps plausibly occur on their own,

²⁰ It is worth noting that there is now some evidence of additional short-term memory effects of colour–kind associations on colour experience (Olkkonen 2017).

²¹ See Hopkins (2012) and Nanay (2012) for a debate about the Perky experiments and role of imagination in the relevant perceptions.

and when combined yield a credible explanation of D&F results: a cognitive state causes a nonperceptual state that reflects the contents of the former, and that nonperceptual state in turn interacts with the burgeoning perceptual state that has related content. Crucial for our purposes is that *imaginative* states or processes are what she proposes for the intermediate nonperceptual state. Thus, regarding D&F results, “the best way to put the idea is that the contribution of the imagination and the contribution of vision combine producing one phenomenal state” (51).²²

For Macpherson perception and imagination can be thoroughly integrated. Interestingly, cognitive states do not seem to be part of what constitutes these imaginative states. What is crucial is that a cognitive state trigger the imaginative state, and that the former’s content constrains (is reflected in) the latter. The imaginative state is then combined with the incoming sensory contents to generate a single perceptual experience, whose nature reflects both contributions.

3.2 *Evaluation of Macpherson*

This is a well-articulated, well-justified argument for a form of PII. Macpherson doesn’t provide criteria for the presence of imagination (she instead draws from the sorts of examples listed above), but her picture fits nicely with Principle, according to which imaginative contributions to a perceptual experience are self-generated contributions to the phenomenology and directedness of that experience that have ampliative effect. In this case the self-generated nature is secured by the fact that the matching irregularities (e.g. making the screen overly red when a cut-out of a characteristically red thing is present) indicates the presence of ingredients to perceptual experience that are not found in the occurrent objective world, and so cannot have been passively received by the senses. That these self-generated contributions have ampliative effect on the phenomenology and directedness of the resulting perceptual experiences is also plausible. Post-manipulation subjects report a perceptual match. This is indicative of a phenomenal match, in this case a phenomenal match secured in part because of the imaginative contribution. Further, the perceptual match is between two objects of subjects’ perception (e.g. a cut-out and a screen), and hence the imaginative contribution is impacting facets of perceptual directedness.

This case suggests a *seamless infusion* of perception with imagination. The subjects do not readily dissect their perceptual experiences into its perceptual and imaginative parts, but instead experience a colour on a surface that, it turns out, reflects a blend of perceptual and imaginative ingredients. It is also worth emphasizing that none of Imagination-as-Deliberate/-Fleeting/-Faint are required: the imaginative contribution to experienced colour is not under subject control or intended, and is not fleeting. There might be room to argue that the imaginative contribution is in some sense a

²² Macpherson later restates the point: “it doesn’t seem plausible to suggest subjects are at any stage aware of two states or two phenomenal characters. So, in this case and perhaps almost all, the relevant imaginative and perceptual processes simply produce one state with phenomenal character whose nature has contributions from both the imaginative and perceptual processes” (55).

faded copy of past perceptions, but at this point the conclusion is not forced and, importantly, the perceptual experience is not characterized by subjects as having anything akin to “faded, imaginative parts”. Beyond the fit with Principle, a few comments are warranted regarding parallels between this contribution and Strawson’s.²³

There are interesting differences between Macpherson’s and Strawson’s contributions. They rely on different sources for empirical justification (i.e. for justifying the perceptual phenomena on which each is focused): Strawson on his own introspection and that of great historical figures, Macpherson on a contemporary and variously used experimental paradigm. This difference is a symptom of how philosophy of perception has changed from 1970 to the present. There are strengths in both approaches, though experimental results arguably have greater currency in contemporary perceptual theory. By reasonable measures Macpherson’s justification for the relevant colour phenomenon is superior to Strawson’s justification for perceptual object-kind and object-sameness (though the latter is by no means bankrupt).

There are also interesting intersections between their chosen phenomena. Here is one example. The D&F results arise because subjects recognize cut-outs as being of certain kinds (i.e. being an apple). In this way some form of perceptual seeing-as and kind-recognition is critical not only to Strawson’s argument but also to Macpherson’s. However, there is, at least at first pass, an important difference. Strawson is insistent that *seeing-as* is part of perceptual experience. By contrast for Macpherson’s argument to work this *seeing-as* need not be perceptual but could instead be merely cognitive. For example, our cognitive systems may categorize the love-heart shaped stimulus as being love-heart shaped, and this may trigger the relevant imaginative state that subsequently infuses the developing perceptual experience. The imaginative contribution itself need not retain this categorization or *seeing-as* information, for all it needs to do is make the relevant colour contribution to the relevant shape. Colour–feature binding is sufficient for this, and thus the *seeing-as a heart-shape* information may only exist at the cognitive level. There may be a means of adapting this model to Strawson’s cases but as it stands this is an interesting difference between their contributions. Setting these differences aside, the similarities between Strawson’s and Macpherson’s contributions outweigh the differences, and extend well beyond their implicit adherence to Principle. Here are four examples.

Regarding the scope of the imaginative infusion Macpherson is non-committal, no doubt because her primary aim is to argue that at least some perceptions are cognitively penetrated, an adequately controversial claim in our current climate. However, it is tempting to push, in agreement with Strawson, for universality or near universality. The kinds of feature associations that the D&F results reveal to have an impact on perceptual experience are confined to colour associations, but beyond that are quite varied. They apply to natural kinds (fruits, lips, faces) and artificial kinds (love-shaped hearts), to chromatic and achromatic cases, and in particular we have no reason to

²³ Note that Macpherson does not discuss or cite Strawson’s article.

believe that there is a discernible class of colour-kind associations to which the D&F results are restricted. Further, given that they are plausibly learned, we shouldn't be surprised to find that colour-kind associations prevalent in a culture, community, family, or individual's life experiences can have the same effect. It may well be that via this reasoning this phenomenon can be extended to other sense modalities and to perceptual experience in general.

Although Macpherson doesn't discuss Strawson's contribution, the form of argument Macpherson offers is akin to Strawson's. Concepts are plausibly where learned kind information is stored and hence cognition is involved. However, cognition alone is not adequate to explain the perceptual phenomena at issue, lacking as cognition does a perceptual character. Something is needed to link the two. For Macpherson as for Strawson this is most plausibly fulfilled by the imagination, a well-known capacity whose outputs are typically taken to have a quasi-perceptual character. Cognition thus retains its causal role as initiator of these imaginative contributions, but the imaginative contributions (and not the cognitions) are what become part of the resulting perceptual states. Finally, the means by which imagination impacts perception is a kind of infusion of the latter with the former: the imaginative contribution is not merely an add-on to the already complete perceptual experience, instead there is a single perceptual experience that arises from both imaginative and sensory contributions.

Recall that there is a reading of Strawson that avoids Top-down Constraint. This is also true of Macpherson's account, though different dialectical forces are at play. Her proposal, unlike Strawson's, is intended to justify the existence of cognitive penetration. Her model for PII, which is formulated within her model for cognitive penetration, does not violate Top-down Constraint and gives no indication of how to violate it. One might regard this as a tacit acceptance of Top-down Constraint. However, on a more liberal reading Macpherson is mute on the matter: given that her aim is to defend cognitive penetration, as opposed to provide a general account of PII, it is inappropriate to take her model for cognitive penetration to define the bounds of PII.

Finally, on the less positive side, some deeper issues are not addressed. How are these imaginative contributions (i.e. past/possible colour perceptions) and perceptual contributions (i.e. present colour perceptions) interwoven in the *processes leading up* to a perceptual experience that is infused with imaginings? How are the past/possible and present elements related *in experience*? A detailed account is not provided, and in this regard Macpherson is no further on this than is Strawson. In her defence, Macpherson's primary focus is the justification of cognitive penetration, not PII, and the former is a substantive task on its own. Nonetheless, this intersection between PII and theories of perceptual experience is crucial to a comprehensive discussion.

All of these details aside, I hope the reader appreciates the overall picture that emerges from these cases. Strawson's argument form for PII is compelling. Macpherson's chosen phenomenon (a surprising facet of colour perception) is well-justified, arguably better justified than Strawson's chosen phenomena. Together these provide the resources to mount a defence of PII. That defence centres on the conception of imagination

embodied in Principle, and it is consistent with Top-down Constraint but does not entail it. With that picture in mind, let us consider a case that creates yet further distance between PII and Top-down Constraint.

4. Overcoming Stimulus Poverty

4.1 *The argument from stimulus poverty*

4.1.1 SKETCH OF ARGUMENT AND OPPOSING VIEW

Let me outline a more controversial defence of PII. The controversiality stems from the following case not inherently involving cognition's purported top-down influence on perceptual experience, but instead on the likelihood of stored contents within the perceptual system itself directly impacting perceptual experience. Call them *stored perceptual contents or assumptions*.²⁴ The present case extends the idea, now central to computational approaches to perception, that perception results from supplementing impoverished stimuli with hypotheses about what is being perceived (i.e. with stored perceptual contents).²⁵ Such hypotheses may be learned or innate/hardwired, universally applicable or highly contextual. The stored contents operate on incoming sensory/stimulus information to help generate experiences of the sort we undergo in perception. The stimulus information is received from the world (a passive component), and the stored contents are added by the self (an active component). The stored contents are in the relevant sense self-generated (i.e. they derive from the subject, the subject is "making them up"). In addition the contribution of the stored contents to perceptual operations is substantive, adding content to the procedure that makes outputs available that could not be obtained simply by copying or dissecting stimulus information. In this way the stored contents are ampliative. However, for the stored perceptual contents to be self-generated contributions with ampliative effect in the sense relevant to PII, they must impact the phenomenology and directedness of perceptual experience. A strong case can be made that this in fact occurs (see below), and thus this case helps justify PII. Yet none of this analysis requires appeal to cognition and top-down effects as they are typically discussed. The analysis is instead mute about the connection to cognition. This case therefore serves as an important test of whether or not PII needs to constrain imaginative contributions to top-down effects, and to my mind the case

²⁴ This sense of content is being ascribed to subconscious states, not to experiential states. In this way direct impact on the nature of perceptual experience is avoided, as it has been throughout, for in theory experience can but need not have these or any other contents.

²⁵ A classic source for computationalism is Marr (1982). Relatedly, a detailed defence of the inferential character of perception is Fodor and Pylyshyn (1981). See also Matthen's (2005) *Sensory Classification Thesis*. In our current climate it is more common to invoke a Bayesian approach to visual processing. Here the stored perceptual contents are the Bayesian priors. The main issues of this work do not hinge on different ways to understand the nature and use of substantive stored perceptual contents, but only on their existence. As such I will sidestep the matter, though it is difficult to be strictly neutral in the text. Where details are helpful I will lean on the classical computational picture. Clark (2012) is a decent example of how the Bayesian approach can be taken to support PII.

provides intriguing evidence for a negative answer. Here is a sketch of the relevant details, beginning with a view, for contrastive purposes, that does not rely on stored perceptual contents of the relevant sort.

Suppose one's visual experience had roughly the characteristics of the images projected onto one's retina by incoming light arrays. Thus instead of experiencing three-dimensional cars and trees of varying sizes and at varying distances, one experiences two-dimensional "flattened" car and tree shapes. Instead of experiencing a stable surface colour on a car that is variably illuminated, one experiences a colour that "conflates" the surface and illuminant information received from the world. This isn't to say that such experiences are experienced as stuck to one's eyes. Instead suppose for discussion that they are experienced as being some reasonable distance in front of one, and presume that the details can be coherently worked out. Call this the *Stimulus Theory* of perceptual experience. One might be led to endorse the Stimulus Theory for example because one is trying to build a theory of experience from what is "strictly" received by the senses. As a sample view one might think of a version of sense-datum theory that postulates "flattened" sense-data (this is of course not true of sense-datum theory in general, e.g. Russell 1912 held that sense-data exist in a multi-dimensional subjective space). In any case the Stimulus Theory is arguably not widely endorsed in part because experience seems to not be like this, and in part because we have better models for why we do not need to think of experience like this. Let me take each claim in turn, and do so by focusing on two phenomena that arguably speak against the Stimulus Theory: amodal completion and perceptual constancies.²⁶

4.1.2 STIMULUS POVERTY AND EXPERIENCE

Cases of amodal completion include: seeing this monitor to not merely consist of its front face but in addition to have thickness and a backside; seeing slices of my dog Kira through a wire fence as not merely dog slices but as parts of a whole Kira; et cetera. In both examples presented or front-facing parts in a scene are *completed* or taken to consist of more than those parts by a capacity we call *amodal completion*. One could try to argue that the completion is not perceptual, or at least not part of perceptual phenomenology, but instead some kind of thought added to one's perceptual experience. This would be to defend a version of the Stimulus Theory for this phenomenon, for strictly speaking information about the depth and backside of my monitor is not currently reflected in my retinal image, nor is information to secure "whole but partly occluded Kira" instead of "Kira slices". However, to many this is disingenuous: it is extremely difficult to interpret our perceptual experiences as consisting only of front-facing, disconnected parts. Amodal completion is by hypothesis a facet of perceptual experience, and hence Stimulus Theory is in this way inadequate.²⁷

²⁶ The following discussion of amodal completion and its connection to PII is partly drawn from Nanay (2010, 2016).

²⁷ There is much to be discussed here, as amodal completion is a subtle and fascinating phenomenon. First, someone who denies that amodal completion is perceptual need not adhere to Stimulus Theory.

Very roughly, perceptual constancies involve experiencing an object to have a stable feature across changes in some “relevant” variable. For example: shape constancy includes experiencing something to have a stable shape despite it rotating with respect to the perceiver; size constancy includes experiencing something to have a stable size despite it approaching(/receding from) the perceiver; colour constancy includes experiencing something to have a stable colour despite changes in illumination conditions; et cetera. These constancies are broadly at odds with what is received by the senses, for the projected retinal shape changes as an object rotates, the projected size increases as an object approaches, and the projected colour information changes as illumination conditions change. Thus an adherent of Stimulus Theory should deny that perceptual constancies are genuinely reflected in perceptual experience. However, to many this is again disingenuous: it is extremely difficult to interpret our perceptual experiences as consisting only of these highly variable projected entities. Constancies are by hypothesis a crucial facet of perceptual experience and hence Stimulus Theory is again inadequate.

To be sure, there are failures of perceptual constancy: sometimes an approaching object looks to be getting bigger, sometimes an object’s colour looks to change across illumination variations, and so on. And during at least some instances of constancy failure our experiences have intriguing similarities with what Stimulus Theory predicts: if an approaching object looks to be getting bigger then its experienced change in size corresponds more closely to its changing projected shape than to its stable distal shape. Analogous remarks hold regarding amodal completion. Stimulus Theory may be helpful for understanding these cases. However, failures of constancy and amodal completion are arguably the exception and Stimulus Theory is on its surface inadequate to explain the successful cases. Thus, *pace* Stimulus Theory, visual experience does not in general have the characteristics of the images projected onto one’s retina by incoming light arrays.

4.1.3 STIMULUS POVERTY AND PROCESSING

Stimulus Theory may seem attractive because it permits a simple account of perceptual processing. Assuming that visual experience roughly has the characteristics of projected light arrays, visual processing need only carry those characteristics into whatever mechanisms yield visual experience to help generate said experiences, and the visual system need only feed those characteristics into cognition to provide a basis for ideas/concepts about what is perceived. On this view visual processing need not involve much more than registering, copying, transporting, and perhaps dissecting sensory stimuli or their contents. However, we do not need to rely on this simple approach to perceptual

For example, such an individual may prefer to speak about what is “presented” to the perceiver instead of what is “projected” on her retina. Second, as Gibson (e.g. 1979) pointed out, there is much more contained in the projected image than is usually recognized (Briscoe 2011 provides a nice overview of this point). Unfortunately, these and other fascinating details do not impact the overall argument of this section and so will be left to the reader.

processing, and this is appreciable independently of whether or not one takes amodal completion and perceptual constancies to be phenomena reflected in perceptual experience. Here is an alternative that derives primarily from perceptual constancy.²⁸

One contemporary model that is opposed to the simple approach to perceptual processing is computational vision. In many regards this approach begins by recognizing that the information contained in sensory stimuli is intrinsically inadequate to determine the distances, shapes, colours, et cetera, of things that are by hypothesis experienced by us perceptually. Sensory stimuli are inherently ambiguous with regard to such distal information—persistent *stimulus poverty* is a working assumption. Having the informational *input* being inherently impoverished with regard to distal information is crucial to what makes the computational approach so useful, for that approach is defined by attempts to formulate assumptions utilized by our perceptual systems (i.e. stored perceptual contents) that, when applied to impoverished inputs, will ultimately yield *outputs* that generally express unambiguous contents about distal things and properties, contents that roughly describe how we perceptually experience the world. Consider two highly simplified examples from vision.

With regard to shape, a projected image is consistent with various associated distal shapes. For example, a circular projected image could be associated with a circle that is perpendicular to the retina, an ellipse that is tilted with regard to the retina, et cetera. Stimulus impoverishment is thus the norm because the informational input *conflates* the shape/orientation pair²⁹ that by hypothesis is the distal cause of this input. A core task of the shape visual system is to overcome this impoverishment. To narrow the field the vision system by hypothesis applies various stored perceptual assumptions to an input to yield an unambiguous output. Perhaps the most famous set of such hypotheses is Spelke's (1990): cohesion (objects move on connected spatio-temporal paths); boundedness (two objects cannot occupy the same spatio-temporal region); rigidity (objects maintain their shape across spatio-temporal regions); no action at a distance (objects only affect one another through contact). These are very general and according to Spelke not the result of learning but arguably hardwired into our visual systems. The thought is that the application of these to the aforementioned inputs provides a good guide (with many more details to come) to the kinds of outputs we typically experience, namely, unambiguous shape/orientation pairs.

With regard to colour perception, the input or stimulus (light striking the retina) is generally taken to contain information (a spectral power distribution) that conflates the contributions of the light reflectance properties of the surface one is looking at (its SSR), and the (incident) illuminant striking that surface. This input can be parsed into

²⁸ I leave to the reader the tasks of articulating processing models that more squarely fit with amodal completion, and of fleshing out the various points of intersection and difference between amodal completion and perceptual constancy.

²⁹ The informational input may conflate more than shape and orientation information. For example it might conflate information about the light refraction properties of the medium through which the light travels to reach one's eyes. I leave these and other such qualifications implicit here and elsewhere.

various SSR/illuminant pairs, making it inherently impoverished with regard to these distal features. The relevant computational task of the vision system is to correctly disambiguate this input, or at least disambiguate it in a way that reasonably resembles the reflectances and incident illuminants before one. Why? By hypothesis the reason is because we do not simply experience in colour perception a conflated SSR/illuminant colour, but something more stable. That is, to some degree colour constancy obtains in perceptual experience.³⁰

Various hypotheses have been put forth as stored perceptual assumptions for our colour vision system that, when applied to these impoverished inputs, yield the desired unambiguous outputs. Land (1986) postulated separate algorithms for each colour. Wandell (1989) postulated three basis vectors that could in theory do most of the requisite work. There are now several options available (see Maloney and Yang 2003 for a review³¹), and given that none on its own provides a near-perfect analysis of human colour perception, it is “likely that the vision system employs more than one” (Maloney and Yang 2003: 335). Thus, even though there is no current consensus on the correct solution, that we should keep searching for a solution within this broad framework still holds considerable sway in contemporary colour science.

4.1.4 THE APPLICATION TO PII

One link between the above and Kant is not generally lost on philosophers, namely that our perceptual systems have hardwired operational constraints (or systemic, stored assumptions) that effectively define how these systems operate and serve to ground at least one kind of necessity in Kantian synthetic knowledge. My interest is not inherently in this, but in the other Kantian connection—to PII. Here the hardwired nature of the stored perceptual assumptions and the necessity they are postulated to explain in debates about synthetic knowledge are not of direct interest.

In the context of PII we seek self-generated contributions to perceptual experience that have ampliative effect, regardless of whether they are learned or hardwired, universal or contextual. The stored perceptual assumptions proposed to help understand experiential and processing aspects of amodal completion and perceptual constancy satisfy these criteria. The proposed stored assumptions are not self-generated with ampliative effect merely because operations are performed on incoming stimuli, but (with respect to processing) because the hypothesized operations require the injection of substantive content, added by one’s visual system, that goes beyond stimulus information. One cannot extract a distal shape/orientation or surface/illuminant pair solely by appeal to a proximal signal that conflates these parameters. If one could then one

³⁰ See e.g. Cohen (2008) for a dissenting view.

³¹ Other models centre on cues as to the nature of the incident illuminant such as shadows, specular highlights, and so on. Note that some of these models have moved away from relying on hardwired systemic assumptions of the sort proposed by Land and Wandell, and instead allow for potentially learned and contextual assumptions. I will remark on this shortly, but the reader should appreciate why it doesn’t impact my overall argument.

wouldn't genuinely have poverty of the stimulus. Stimulus poverty is overcome by supplementing the process with additional (ampliative and self-generated) content, in this case in the form of assumptions of the abovementioned sort.

To satisfy Principle we in addition need reason to hold that these stored perceptual assumptions directly contribute to the directedness and phenomenology of the resulting *experiential* state. These criteria are satisfied by a commitment to perceptual constancies and amodal completions being reflected in perceptual experience in the manner that they plausibly are. The constant and completed aspects of said experiences are both aspects of the directedness and phenomenology of one's experiences: a constant shape is experienced (phenomenology) as belonging to a rotating bottle (directedness), and a "completion" is experienced (phenomenology) as belonging to a partly occluded bottle (directedness). The proposed stored perceptual assumptions are plausibly the difference between experiences involving constancy and completion success versus failure. Given the robustness of constancy and completion success it is reasonable to conclude that the proposed stored assumptions are self-generated ingredients with ampliative effect. Principle is satisfied.

4.2 *Evaluation of the argument*

Consider several commonalities and one difference between this argument and the arguments employed by Strawson and Macpherson. The argument from stimulus poverty avoids commitment to Imagination-as-Deliberate/-Fleeting/-Faint, in agreement with the Strawson and Macpherson arguments.

The argument from stimulus poverty does not purport to explain how perceptual experiences arise from computational processes. The point is instead that, *however* experiences arise from these processes, the experiences involving constancy and completion success have a directedness and phenomenology that is accurately described not merely by the stimulus information received from the world, but by stimulus information that is somehow blended with stored assumptions. The current argument is analogous to the one employed by Strawson and Macpherson on this point.

The argument from stimulus poverty as applied to perceptual constancy posits *seamless infusion*, much like Macpherson's argument does for colour. The imaginative and perceptual ingredients to a given constancy experience are not readily discernible by naïve subjects, but are instead blended together within an experience of a stable thing. However, with regard to amodal completion matters are different. Here the experienced thing can to a significant degree be broken into its presented parts and its occluded parts. These parts are experienced as belonging to the same thing—*completion* is occurring—but their character in experience is different. Some would say that the presented parts are phenomenally present in a way that the occluded parts are not (e.g. the present parts are phenomenally present as present whereas the occluded parts are phenomenally present as absent, see Macpherson 2010). In any case, since on some proposals (e.g. Nanay 2010) imaginative contributions explain the occluded parts and perceptual contributions explain the presented parts *seamless infusion* is not occurring.

The extent of the imaginative infusion in the present case extends as far as the phenomena it is postulated to explain. These phenomena (constancy and completion) arguably extend quite far, and thus so too does the proposed imaginative infusion. This exactly parallels the Strawson and Macpherson arguments.

Finally, by contrast with the Strawson and Macpherson arguments, the current argument does not overtly rely on cognition to trigger imaginative contributions. Instead the current argument relies only on the plausible use of self-generated ingredients with ampliative effect on perceptual experience, regardless of their connection to cognition. To some this will mark a weakness in the current case, for there is intuitive appeal to Top-down Constraint. Consider two replies. First, the stored perceptual assumptions utilized to understand constancy and completion experiences could have partial bases in cognitive systems (or be fully based in cognition in at least some organisms). Having an experience of a complete but partly occluded dog or of a stably coloured but variously shadowed dog may utilize cognitive stores (e.g. for *dog*) in much like the way cognitive stores are utilized in the Strawson and Macpherson arguments. Thus this difference may in the end dissolve.

Second, and more interestingly, why must imaginative contributions to perception be due to top-down effects? Recall that neither Strawson nor Macpherson actually defends Top-down Constraint (for different reasons), so beyond the Constraint's intuitive appeal we haven't relied on its truth. For example, if some facets of the colour-kind associations postulated to explain the D&K results are stored in early or intermediate vision, I'm not sure why those facets would thereby be excluded from Macpherson's argument for PII (even though they would be excluded from her argument for cognitive penetration). More bluntly suppose that in some organism, whose behaviour supports the D&K results, the relevant colour-kind associations *are* stored in early vision (e.g. through hardwired assumptions that are present due to intentional design or natural selection or whatever). This might matter for one's analysis of cognitive penetration, but why is it relevant to one's analysis of PII? That organism's perceptual system is actively contributing to its perceptual states in a manner that has direct, ampliative effect on its perceptual experiences.

Cognition occupies a causal role in Strawson's and Macpherson's arguments—it triggers the imaginative contributions into action. On one interpretation, cognition *contingently* occupies this casual role in their arguments for PII. If there is something in early or intermediate vision that can goad imagination into generating past/possible perceptions, and a capacity to blend these with current perceptions, then I suspect we should reject Top-down Constraint. In response one can broaden one's conception of cognition to include these options, thus keeping PII and cognitive penetration aligned. This suggestion is not hostile to the present work (if there is anyone wishing to defend it), but it is hostile to mainstream contemporary views of cognition. Alternatively one can double-down on Constraint, a commitment that may yield fruitful future debate. Part of the value of the argument from stimulus poverty is that it pushes us to explore these possibilities. If some form of nonconceptual or low-level content is adequate to

explain some self-generated ingredients with ampliative effect on perceptual experience, then perhaps the resulting experiences do not cease to be infused with imaginings. Instead perhaps imagination ceases to be inherently tied to cognition.

5. Conclusion

The idea that most or all perceptual experiences are infused with imaginative contributions (PII) is not new. If I succeeded in my aims it is also not stale, for perceptual phenomena, experimental paradigms, and theoretical frameworks that are of interest to contemporary perceptual theorists bear directly on the issue. Indeed in my judgment they provide reasonable support for PII. I spent considerable space at the outset (section 1) trying to frame the debate in a way that didn't provide a quick route to rejecting PII, but also didn't leave the PII advocate with an easy victory. I settled on the idea ("Principle") that a perceptual experience is infused with imagination if and only if there are self-generated contributions to that experience that have ampliative effect on its phenomenal and directed elements. Self-generated ingredients are, in some reasonable sense, causally produced by the subject as opposed to being received from the world. Some form of stored content is an obvious starting point. Ampliative effects are perceptual experiential aspects that outstrip what the senses get from the world. This conception of imaginative contributions to perceptual experience does not presume that imaginings are deliberate, fleeting, or faint, and does not presume that imaginative contributions must be cognitively induced, universal, or innate. There is also no requirement that subjects be able to readily discern the imaginative or the perceptual contributions to a given experience.

This conceptual framework was applied to three case studies: object-sameness and object-kind recognition (Strawson, in section 2), some interesting colour effects (Macpherson, in section 3), and perceptual constancy and amodal completion (in section 4). I emphasized the value of Strawson's form of argument for PII, which was perhaps unknowingly applied by Macpherson to a distinct phenomenon. That argument form presupposes Principle or something in the vicinity. If the three cases and my overall analysis are accepted (a substantive *if*), then we have a forceful inductive argument for PII. Note, however, that the cases heavily depend on vision and thus one should be cautious in generalizing to other modalities.

Throughout this work I sought to keep issues pertaining to theories of perceptual experience in the background. There is a natural tension between PII and naïve realism, and fairly a straightforward means of accommodating PII within representationalism and sense-datum theory. However, I did not wish to prejudge the issue, and can conceive both of manoeuvres the naïve realist can make on her behalf and of challenges that might arise for the other views. More importantly, assessing PII from the theory of perceptual experience would have yielded a far different work.

There are various other phenomena relevant to PII. Nanay (2016) offers peripheral vision; one might consider modal completion, other experiences of kind membership,

afterimages, hallucinations, perceptual groupings, perceptual disambiguations, and so on. The result may be that adjustments are needed to both the present conception of PII and the above arguments for it. Additional focus on PII would be welcome in any case, for what is at stake is whether we perceive the world as it is given to us or as we imagine it to be. In my view, we do both but struggle to tell the difference.

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