

## Cognitive Penetration, Imagining, and the Downgrade Thesis

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### Introduction

We tend to think that perceptual experiences tell us about what the external world is like without being influenced by our own mind. However, recent philosophical and psychological research indicates that this might not be true: our beliefs, expectations, and other mental states might influence what we experience. This phenomenon is called the “cognitive penetration” of perceptual experience.<sup>1</sup>

Siegel (2012) presents a hypothetical case of cognitive penetration:

**Anger:** Jill believes that Jack is angry with her. When she later sees Jack, this belief causes her to experience Jack’s face as expressing anger, despite the fact that Jack does not have an angry face at all.

Delk and Fillenbaum’s 1965 experiment is often regarded as a case in which cognitive penetration actually occurred:

**Apple:** The participants were presented with pictures of various objects, cut out from a uniform orange paper. Some of these objects were typically red, such as an apple; others were not typically red, such as a mushroom. All of them were shown in front of a background, whose color could be gradually

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<sup>1</sup> For some defenses of cognitive penetrability, see Cecchi (2014), Churchland (1988), Hohwy (2013), Macpherson (2012), and Vetter and Newen (2014). For rejections, see Deroy (2013), Firestone and Scholl (2015), Fodor (1984 and 1988), Pylyshyn (1999), and Raftopoulos (2001). For further discussions on the issue, see the anthology *The Cognitive Penetrability of Perception: New Philosophical Perspectives*, edited by Zeimbekis and Raftopoulos (2015).

adjusted from yellow through orange to red. The participants were requested to adjust the background until it exactly matched the color of the pictures.

Although the apple and the mushroom were cut out from the same orange paper, the participants set the background closer to red for the apple than for the mushroom. What happened in this experiment seems to be: the participants' cognition that apple-shaped objects are typically red influenced their visual experience of the apple picture.<sup>2</sup>

What is the epistemological implication of cognitive penetration? Do cognitively penetrated perceptual experiences have the same evidential force as ordinary unpenetrated perceptual experiences do? According to the *Downgrade Thesis*, some cognitively penetrated perceptual experiences are epistemically downgraded in the sense that they give their subjects less justification than unpenetrated perceptual experiences would usually give. For example, in the Anger case, Jill's experience gives her less justification for believing that Jack is angry than an unpenetrated anger experience; in the Apple case, the participants' experience gave them less justification for believing that the apple picture was red-orange than an unpenetrated red-orange apple experience.<sup>3</sup> Several arguments have been proposed to support the Downgrade Thesis, but for reasons that I have no space to spell out, I am not entirely satisfied with them.<sup>4</sup> In this paper, I will offer an alternative argument, which I think works better.

My argument will build on Macpherson (2012)'s psychological mechanism of how some cognitive penetration takes place: imagining plays a significant role in cognitive penetration. I

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<sup>2</sup> For more recent variations of this experiment, see Hansen et al (2006), Olkkonen et al (2008), and Witzel et al (2011).

<sup>3</sup> The phrase "Downgrade Thesis" is from Siegel (2013 a).

<sup>4</sup> For defenses of the Downgrade Thesis, see Ghijsen (2016), Lyons (2011), McGrath (2013 a and 2013 b), Siegel (2012, 2013 a, 2013 b, and forthcoming), Vahid (2014), and Vance (2014). For criticisms of the Downgrade Thesis, see Fumerton (2013), Huemer (2013), and Tucker (2014).

will argue that some imaginings lack evidential force because they are experiences that we fabricate for ourselves. I will apply this epistemology of imagining to cognitive penetration and argue that because of the role that imaginings play, some cognitively penetrated perceptual experiences are partly fabricated by their subjects. These experiences give their subjects less justification for believing the relevant contents than unpenetrated perceptual experiences would usually give. Given that my approach of defending the Downgrade Thesis draws connections between the epistemology of imagining and that of cognitive penetration, even if the existent arguments for the thesis do succeed, my approach will nonetheless bring a new and interesting perspective to the discussion.

The rest of this paper will proceed as follows. Section 1 will say more about cognitive penetration and the Downgrade Thesis. Sections 2 and 3 will develop a positive account of how cognitive penetration works based on Macpherson's psychological mechanism, and will defend it against some important objections from Deroy (2013). Section 4 will present my argument for the Downgrade Thesis from the epistemology of imagining. Section 5 will focus on some good cases of cognitive penetration, and will explain why perceptual experiences in such cases give their subjects no less justification.

## **1. Preliminaries**

In order to discuss cognitive penetration, we need to clarify what we mean by "perceptual experience" and "cognitive state." In psychology and philosophy, "perceptual experience" usually refers to conscious states that are produced by perceptual processes rather than unconscious states that are produced by those processes. Some examples of the latter are the outputs of the early visual system and blindsight states. As conscious states, perceptual

experiences have phenomenal character in the sense that there is “something it is like” to undergo them. For example, what it is like to see a dog is different from what it is like to see a flower, which is also different from what it is like to smell a flower. Moreover, what it is like to see a flower from a near distance is different from what it is like to see it from a far distance. These differences are differences in the phenomenal character of perceptual experiences.

I will assume the “content view” of perceptual experiences, according to which perceptual experiences are representational and have propositional contents that can be true or false.<sup>5</sup> There is a debate about what contents perceptual experiences can have—whether they can have the same contents as beliefs do. For the sake of discussion, I will assume that perceptual experiences and beliefs can have the same contents.<sup>6</sup> Another relevant debate is whether perceptual experiences can represent “high-level” properties such as being angry in addition to “low-level” properties such as color, shape, and volume.<sup>7</sup> For the sake of discussion, I will assume that they can represent high-level properties. With respect to the relationship between the contents of a perceptual experience and the phenomenal character of a perceptual experience, I will work with the assumption that there can be no change in one without a change in the other.

The other term that needs clarification is “cognitive state.” Here I use it to refer not only to beliefs, thoughts, knowledge, expectations, but also to other personal-level psychological states that are potential penetrators of perceptual experiences, such as emotions and desires. Generally speaking, cognitive penetration refers to the situation in which two subjects have perceptual experiences with different phenomenal character and contents due to differences in their

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<sup>5</sup> For recent defenses of the content view, see Byrne (2009), Pautz (2010), and Siegel (2010 a and b).

<sup>6</sup> For example, I will assume that perceptual contents, like belief contents, are conceptual. For defenses of this view, see Brewer (1999), Craig (1976), McDowell (1994), Peacocke (1983), and Sedivy (1996). For challenges to this view, see Dretske (1981), Martin (1992), Peacocke (1992 and 2001), and Tye (1995).

<sup>7</sup> For defenses of the view that perceptual experiences only represent low-level properties, see Clark (2000), Dretske (1995) and Tye (1995). For defenses of the view that perceptual experiences can also represent high-level properties, see Peacocke (1992), Siegel (2006), and Siewert (1998).

cognitive states, when the following factors are held fixed: the distal stimuli, the external conditions such as lighting, the conditions of the subjects' sensory organs, and the subjects' focus and spatial attention.<sup>8</sup>

This characterization of cognitive penetration needs further explanation. It is known that cognitive states can influence perceptual experiences by causing some bodily movements or actions. Suppose that I want to visit Boston, and I know that airplanes can take me there. This causes me to open my computer, buy an airplane ticket, and fly to Boston. As a result, I have various perceptual experiences of the city. Moreover, cognitive states can influence perceptual experiences by shifting the subjects' focus and spatial attention. Suppose that during my stay in Boston, I visit Widener Library at Harvard Yard. Recalling my knowledge about the architectural style of the building, I direct my focus and spatial attention to different parts of it, and hence have different perceptual experiences. Actions and the allocation of focus and spatial attention are standard pre-perceptual phenomena.<sup>9</sup> Our discussion does not take cognitive effects on them as cognitive penetration of perceptual experiences.

However, there are other kinds of attention than spatial attention. For example, even if we fix our eyes on a location, object-based attention can make some objects at or near that location more noticeable than other objects. Moreover, even if we pay our attention to a particular object, feature-based attention can make some of its properties more noticeable than other properties. Although the allocation of focus and spatial attention occur before perceptual processing, there is evidence that object-based attention and feature-based attention can occur during perceptual processing,<sup>10</sup> and cognitive effects on these kinds of attention can be cognitive penetration of

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<sup>8</sup> For similar characterizations, see Macpherson (2012), Siegel (2012), Stokes (2013), and Vance (2014).

<sup>9</sup> For discussions about the allocation of focus and spatial attention being a pre-perceptual phenomenon, see Macpherson (2012), Pylyshyn (1999), and Raftopoulos (2001).

<sup>10</sup> See Cecchi (2014), Mole (2015), Wu (forthcoming), and Yeh and Chen (1999).

perceptual experiences. In fact, one might think that the Apple case can be a case like this: when the participants saw the apple picture that was orange, their cognition that apple-shaped objects are typically red caused them to attend to the red component within the orange color and to neglect the yellow component; that is why they saw the picture as redder.<sup>11</sup>

Another point about cognitive penetration is that in order for some cognitive influence on a perceptual experience to count as cognitive penetration, the cognitive influence must be semantically intelligible and coherent.<sup>12</sup> Consider a different version of the Anger case, in which Jill's belief that Jack is angry does not cause her to experience Jack's face as expressing anger but instead causes her to have a migraine, which then makes her experience everything as distorted.<sup>13</sup> Or consider a different version of the Apple case, where the participants' cognition about the typical color of apples caused them to have visual experiences of random people rather than to see the apple picture as somewhat redder. Although there are causal connections between the relevant cognitive states and perceptual experiences in these cases, the connections are not semantically intelligible or coherent. I do not count such cognitive influences as cognitive penetration.

Now, I want to say a few words to clarify the Downgrade Thesis, which claims that some cognitive penetration drastically limits the evidential force of our perceptual experiences. This thesis can be formulated more precisely into the following principle:

**The Downgrade Thesis:** For some cognitively penetrated perceptual experiences, if they are cognitively penetrated to represent that P, then they are epistemically downgraded with respect to believing that P—that is, they give

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<sup>11</sup> Macpherson (2012) mentions this explanation of the apple case, but as we will see in the next section, her own proposal differs from it.

<sup>12</sup> See Hohwy (2013), Macpherson (2012), and Pylyshyn (1999).

<sup>13</sup> See Macpherson (2012).

their subjects less justification for believing that P than perceptual experiences that are unpenetrated to represent that P would usually give.

First, the Downgrade Thesis only applies to beliefs about the external world, such as “Jack is angry” and “The apple picture is red-orange,” rather than to self-ascriptions of experiences such as “I have a visual experience that Jack is angry” and “It looks that the apple picture is red-orange.” Apparently, cognitively penetrated perceptual experiences give us no less justification for the latter kind of beliefs.

Second, the Downgrade Thesis only applies to beliefs that endorse the relevant cognitively penetrated contents. For example, in the Anger case, although Jill’s visual experience gives her less justification for believing that Jack’s face is angry, it might give her no less justification for believing that Jack is wearing a green polo shirt. In the Apple case, although the participants’ visual experience gave them less justification for believing that the apple picture was red-orange, it might give them no less justification for believing that the apple picture was presented in front of a background.

Finally, the Downgrade Thesis does not claim that all cognitively penetrated perceptual experiences are epistemically downgraded, but only that some are. The consideration is that if perceptual experience is cognitively penetrable, then there might be different psychological mechanisms through which cognitive penetration occurs, and not all of them need to produce epistemically downgraded perceptual experiences. Moreover, even if some psychological mechanisms produce epistemically downgraded perceptual experiences, they need not only produce such experiences. It is possible that one mechanism can produce both epistemically downgraded perceptual experiences and not epistemically downgraded perceptual experiences.

In the rest of this paper, I will build on Macpherson's mechanism of cognitive penetration and will bring out its epistemological implications.

## **2. Macpherson's Mechanism of Cognitive Penetration**

Macpherson (2012)'s psychological mechanism consists of two steps: in the first step, some cognitive states activate an imaginative experience or an imaginative process that would normally lead to such an experience; in the second step, the imaginative experience or process interacts with the perceptual experience or process to produce an experience that is a mixture of the two experiences or has contributions from both processes. According to this mechanism, what happened in the Apple case was that the participants' cognition that apple-shaped objects are typically red caused them to have an imaginative experience that the apple picture was red or caused an imaginative process that would normally produce such an experience. The imaginative experience or process interacted with the participants' visual experience that the apple picture was orange or with the perceptual process that would normally produce such an experience, leading to an experience that the apple picture was red-orange.<sup>14</sup>

Macpherson does not say much about what she means by "imaginative experience" or "imaginative process" but she seems to use the former to refer to perception-like experiences that are not caused by the appropriate external stimuli,<sup>15</sup> and seems to use the latter to refer to processes that produce imaginative experiences. She argues that there is independent evidence

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<sup>14</sup> Macpherson first characterizes the interaction as one between the participants' imaginative and perceptual experiences, but then she doubts that the participants were aware of more than one phenomenal states, so she rephrases the idea as: "the relevant imaginative and perceptual processes simply produce one state with phenomenal character whose nature has contributions from both the imaginative and perceptual processes" (Macpherson 2012, p. 55).

<sup>15</sup> To say that imaginings are not triggered by the "appropriate" external stimuli is not to say that external stimuli play no triggering role at all in generating imaginings. When it is not raining and we imagine seeing rain, our imagining is not caused by the appropriate external stimuli—namely rain, but other external stimuli, such as black clouds and swaying trees, might nonetheless play some triggering roles in our having the imagining.



that each step of her mechanism can occur. First, it is widely illustrated that cognitive states can trigger imaginative experiences or processes. For example, our expectation that it will rain can cause us to imagine seeing rain; our suspicion that our safety is in danger can cause us to imagine hearing a gunshot. However, to say that cognitive states can trigger imaginative experiences or processes is not to say that we must always trigger them deliberately. Some imaginings seem to arise spontaneously and just pop into our mind, such as in the case of daydreaming.<sup>16</sup>

Second, Macpherson argues that the Perky effect shows that an imaginative experience or process can interact with a perceptual experience or process to produce an experience that is a mixture of the two experiences or has contributions from both processes. C. W. Perky (1910) conducted a series of experiments, in which the participants were asked to imagine a few objects, such as a tomato, a book, a banana, and a leaf, while unbeknownst to them, faintly colored pictures of those objects were projected onto the screen where they fixated. Since Perky made sure that the pictures were above the general visual threshold for the participants, it is plausible that the participants saw the pictures. In fact, the pictures seemed to influence the participants' experiences—for example, the participants reported having an image of an elm leaf when an elm leaf was shown on the screen, and reported having an image of a vertically oriented banana when a vertically oriented banana was shown on the screen. But the participants claimed that they were just imagining. These results were usually taken to show that perceptual experiences could have the same contents or phenomenal character as imaginative experiences.

Consistent with this conclusion, other results of the same experiments showed that some participants called up imaginative experiences or processes, and their resulting experiences were mixtures of their imaginative experiences and perceptual experiences or had contributions from both processes. For example, one participant reported his experiences with both perceptual and

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<sup>16</sup> For a similar distinction, see Walton (1990).

imaginative details: “the tomato was seen painted on a can, the book was a particular book whose title could be read, and the lemon was lying on a table, the leaf was a pressed leaf with red markings on it” (Perky 1910, p. 432). If we take this participant’s testimony seriously, then his experiences seemed to be amalgams of his visual experiences of the projected pictures—the tomato, the book, the lemon, etc.—and imaginative experiences of various other details—the can, the book title, the table, etc., or seemed to have contributions from both the perceptual process and the imaginative process.

Macpherson does not say much about this, but following Perky, S. J. Segal (1971, 1972) examined whether an imaginative experience or process could assimilate elements from a perceptual experience or process. Based on the results of her experiments, Segal concluded, “assimilation is a real, reliable, and replicable effect” (Segal, 1972, p. 226). Here are two cases crystalized from Segal’s experiments:

**Manhattan:** The participants were asked to imagine a city skyline, while unbeknownst to them, a faint red tomato was projected onto the screen where they fixated. Several participants reported that they had an image of Manhattan at sunset.

**Tomato:** The participants were seated under a vinyl hood and asked to imagine a tomato. They reported the tomato as red when, unbeknownst to them, a faint red tomato was projected onto the surface of the hood, whereas they reported the tomato as “shaded or dirty” red, as “shiny,” as a “homegrown” tomato when a faint beer was projected.

In these two cases, both perceptual and imaginative experiences or processes seemed to contribute to the participants’ resulting experiences. Cases like these two further indicate that the

second step of Macpherson’s mechanism—the interaction between perceptual and imaginative experiences or processes—can independently occur.

If perceptual experiences or processes can interact with imaginative experiences or processes, a question to ask is: what is the nature of the resulting experiences? Are they perceptual experiences, imaginative experiences, or amalgams of both? Macpherson is not so interested in which category the resulting experiences belong to. She thinks that what matters the most is that both perceptual and imaginative experiences or processes contribute to the resulting experiences.<sup>17</sup> However, in order for her mechanism to explain the occurrence of cognitive penetration, it is important that the experiences produced by the mechanism are perceptual experiences. Otherwise, there would be no cognitive penetration in the relevant sense.

Before ending this section, I want to make one more point. Macpherson’s mechanism focuses on a particular kind of interaction between imaginative and perceptual experiences or processes—both experiences or processes directly contribute to the content and phenomenal character of the resulting experiences (recall her explanation of the Apple case: the participants’ imaginative experience or process contributed a red element, and their perceptual experience or process contributed an orange element, resulting in their red-orange experience). This does not mean that imaginative experiences or processes can only interact with perceptual experiences or processes in the form of direct content and phenomenal contribution. There might be other kinds of interaction between these experiences or processes, through which cognitive penetration could occur and which could be coherently incorporated into Macpherson’s mechanism. This point will

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<sup>17</sup> When Macpherson discusses the Perky effect, she writes, “What does seem clear is that the phenomenal character of the resulting state—be it an imaginative one, or a perceptual one mistaken for an imaginative one, or some combination of perceptual or imaginative state—has aspects contributed by perceptual and imaginative processes” (2012, p. 53). She takes the assimilation of external stimuli into dreams as another illustration of the interaction between perceptual and imaginative experiences or processes. There she writes, “As with the Perky case, I am not interested in whether it is correct to say that a subject who has, say, the sound of their alarm clock incorporated into their dream, is dreaming of the sound or hearing the sound, or some amalgam of the two” (2012, p. 53).

be critical when we discuss how our approach explains good cases of cognitive penetration in section 5.

### **3. Deroy's Objections to Macpherson's Mechanism**

Deroy (2013) rejects Macpherson's mechanism by drawing our attention to some more recent experiments on color experiences conducted by M. Olkonen and her colleagues (2008):

**Banana:** The participants were presented with three versions of fruit pictures: pictures of fruits with surface texture (e.g. a picture of a yellow banana with surface texture), pictures of fruits with no surface texture (e.g. a picture of a yellow banana without surface texture), and mere outline shapes of fruits (e.g. a yellow outline shape of a banana). The participants were asked to set the color of the pictures to grey. As it turned out, they set the color more toward the opposite direction from the fruits' typical color than the standard grey point (e.g. more toward blue for the banana). This suggested that at the point where the pictures were grey, the participants still saw them as closer to the fruits' typical color (e.g. yellower for the banana). But interestingly, the effects were strongest with textured fruit pictures, yet weakest or almost absent with outline shapes (e.g. more toward blue for the textured banana picture than for the untextured banana picture, than for the banana outline shape).

Deroy points out that outline shapes should be no less effective in triggering cognitive states about the relevant fruits than pictures. If the effects on color experiences in the Banana case were cognitive penetration, then they should be more or less the same with all three versions

of fruit pictures. However, in the Banana case the effects varied significantly among different versions of fruit pictures, so the effects were probably not cognitive penetration.

Moreover, Deroy thinks that the Banana case reveals a more fundamental problem of Macpherson's mechanism: entertaining the relevant cognitive states is not sufficient for the effects on color experiences to occur. She draws our attention to the fact that we can at least partly decide whether to entertain a cognitive state, but we cannot decide when the effects on color experiences occur or how the effects vary. For example, we cannot activate the effects by bringing to mind the concept of a banana or beliefs about the typical color of bananas while looking at a circle. Neither can we activate the effects by bringing to mind the concept or beliefs while looking at an outline shape of a banana, as showed by the Banana case above. Therefore, argues Deroy, we need an alternative explanation of the occurrence of and the variation in the effects in the Banana case.

What is an alternative explanation of the effects? Deroy proposes that they are top-down influences within the perceptual system. Following Massaro (1998 and 1999), Deroy embraces the view that when we perceive something, the perceptual system first processes the information from different sensory channels separately and then combines and integrates the information according to "logically optimal decisions." Nonetheless, the logically optimal decisions and sensory integration are affected by "multimodal representations" stored within the perceptual system. For example, there is a multimodal representation of bananas that keeps all the sensory information—such as color, shape, volume, texture, smell, and taste—acquired from perceiving bananas. When we perceive an object with matching properties, this multimodal representation is triggered to influence, from top down, our perception of the object's other properties.

Deroy argues that this mechanism can explain the Banana case: viewing fruit pictures triggered the multimodal representations of the relevant fruits, which consequently influenced the participants' color experience of those pictures. Such effects were automatic because they occurred within the perceptual system. Moreover, since textured fruit pictures and untextured fruit pictures represented more matching properties with the relevant multimodal representations than mere outline shapes of fruits, they were more effective triggers of the relevant multimodal representations. This explains the variation in the effects on color experiences in the Banana case. Finally, Deroy points out that her mechanism can also explain the absence of such effects for shapes like a circle and a square: there are no multimodal representations that bind these shapes with particular colors, so the effects do not occur for them.

However, I do not think that Deroy has shown that her mechanism is superior to Macpherson's. First of all, it is not clear why outline shapes are less effective triggers of the multimodal representations than fruit pictures—especially in the case of a banana. The reason for which Deroy thinks that having more matching properties with a multimodal representation triggers the multimodal representation more effectively seems to be that different multimodal representations can store overlapped information, and having more matching properties makes it easier to single out a multimodal representation. For example, the multimodal representations of cucumbers, zucchinis, and eggplants can store similar shape information—“cylindrical shape with rounded ends.” A picture that only represents this property will be a less effective trigger of the multimodal representation of cucumbers than a picture that in addition represents a warty surface.

However, this does not mean that in order to single out a multimodal representation, there always have to be many matching properties—something might have such a unique property that

simply perceiving that property is sufficient to trigger the relevant multimodal representation. Consider that your mother has a unique voice, and whenever you hear it you know that the person who makes it is your mother. Or consider that MacBook used to have a unique keyboard layout, and whenever you saw a congruent keyboard layout you were certain that the computer was a MacBook. Why couldn't there be parallel cases with respect to triggering multimodal representations? For example, some fruits—such as a banana—are of such unique shapes that merely perceiving the shapes might be enough to trigger the relevant multimodal representations. But then, Deroy fails to convince us that outline shapes are less effective triggers of multimodal representations than textured fruit pictures and untextured fruit pictures, and therefore fails to explain the Banana case.<sup>18</sup>

Not only does Deroy fail to support her mechanism, her objections to Macpherson's mechanism also do not stand up to scrutiny. Deroy takes Macpherson to commit to the idea that merely entertaining certain cognitive states is sufficient for cognitive penetration to occur, but Macpherson actually rejects this idea:

Of course, it may not be that all imaginative states can combine with perceptual ones to change the perceptual character of the resulting state. I do not suppose that occurs, in part, because I can't change my perceptual experiences at will by imagining.... Very specific conditions for interactions

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<sup>18</sup> In fact, I think that Macpherson is on a par with Deroy when it comes to the question whether a given outline shape is an effective/ineffective trigger of the relevant multimodal representation or cognitive states. If a cylindrical shape is not an effective trigger of the multimodal representation of cucumbers because the multimodal representations of zucchinis, cucumbers, and eggplants store very similar shape information, then it is also unclear how this shape could be an effective trigger of cognitive states about cucumbers—after all, cognitive states about zucchinis, cucumbers, and eggplants might as well include very similar shape information. On the other hand, if an outline shape of banana, due to its unique shape, is an effective trigger of the multimodal representation of bananas, then the outline shape is also likely to be an effective trigger of cognitive states about bananas. Given the latter point, I doubt that Macpherson or Deroy can explain the Banana case by simply maintaining that the outline shape of banana is less effective in triggering the multimodal representation of bananas or cognitive states about bananas than the untextured banana picture, than the textured banana picture. The explanation should lie somewhere else.

between perceptual and imaginary processes may exist. For example, the difference between voluntary and involuntary processes may have some, as yet unknown, role to play, as may one's familiarity with what one is imagining, as may some relations between imagined and perceived properties. These are matters for further philosophical reflection and no doubt in part for psychologists to investigate. (Macpherson 2012, p. 58)

An argument Deroy proposes to reject Macpherson's mechanism is that bringing to mind cognitions about a banana while looking at a circle fails to cause the effects on color experiences to occur. However, a parallel case also seems to challenge Deroy's own mechanism: looking side by side at a textured banana picture and a circle in the same shade also fails to cause the effects on color experiences to occur—the banana picture does not look any yellower than the circle. To deal with this challenge, Deroy might as well admit that the occurrence of the effects on color experiences depends on further conditions in addition to the activation of relevant multimodal representations. She might argue that we are unable to identify what those conditions are since we still know too little about perceptual processing. But then, she cannot reject Macpherson's mechanism by simply pointing out that entertaining some cognitive states is insufficient for the effects on color experiences to occur because Macpherson also acknowledges that further conditions are needed.

So far, I have not said anything about how Macpherson's mechanism deals with the Banana case—how it explains the variation in the effects on color experiences of different versions of fruit pictures. Now I introduce a possible explanation by inviting you to consider these two cases: in the first case, you first look at a scratchy pencil sketch of a garden and then imagine seeing a garden; in the second case, you first look at a clear photograph of a garden and



then imagine seeing a garden. Will your imaginative experiences be different in these two cases? I think that the answer is “Yes.” You will very likely have a more vivid and detailed imaginative experience of seeing a garden in the second case than in the first. The reason, I suspect, is that which picture you see can influence how you subsequently visualize a garden.

According to Macpherson’s mechanism of cognitive penetration, cognitive states influence perceptual experiences by generating some imaginative experiences or processes. In light of the two garden cases above, Macpherson might explain the variation in the effects on color experiences as follows: seeing a more natural fruit picture—such as an untextured fruit picture or a textured fruit picture—helps trigger a more vivid imaginative experience of the fruit or an imaginative process that would normally produce such an experience, which then has greater influence on the participants’ color experience of the picture. On the other hand, seeing a less natural fruit picture—such as an outline shape—is likely to trigger a less vivid imaginative experience of the fruit or an imaginative process that would normally produce such an experience, which in turn has weaker influence on the participants’ color experience of the picture. This explanation is a plausible and coherent supplement to Macpherson’s mechanism.

#### **4. The Imagining Argument**

In this section, I present an argument for the Downgrade Thesis based on Macpherson’s mechanism, which I will call the “Imagining Argument.” For the sake of discussion, I will be only concerned with imaginings that are caused by cognitive states through a semantically intelligible route. Here is the plan. First, I will argue that some imaginings lack evidential force. Then I will argue that because of the role that imaginings play, some cognitively penetrated perceptual experiences are epistemically downgraded.

To begin with, let's consider the following case: Sam expects that it will rain, so he imagines seeing rain when he looks out the window (the Rain-Imagining case). Apparently, Sam's imaginative experience does not give him justification for believing that it is raining. Why? One explanation is that in imagining the rain, Sam knows that the source of his experience is from within, so he has evidence that he is not seeing the rain. This evidence is a defeater of the justification provided by his imagining.<sup>19</sup> According to this explanation, Sam has prima facie justification from his imagining for believing that it is raining, but because he is aware that he is imagining, the prima facie justification fails to constitute all-things-considered justification. I do not find this explanation adequate because Sam seems to lack prima facie justification in the first place.

Another explanation appeals to the poor phenomenal character of Sam's imagining. For example, one might argue that it lacks the distinctive phenomenal character ordinary perceptual experiences have—phenomenal force, where the phenomenal force of an experience consists in that the experience represents its contents in such a way that it assures the subject of its contents' truth.<sup>20</sup> The underlying logic of this explanation seems to be that had Sam produced the imagining with phenomenal force, it would have the same evidential force as an ordinary visual experience of rain. For me at least, this is not the complete story. What goes wrong here not only seems to be that Sam's imagining has poor phenomenal quality, but also something else, namely the imagining is an experience that Sam fabricates for himself, so he does not have justification from the imagining for believing that it is raining.

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<sup>19</sup> For general discussions of defeaters, see Bergmann (2006), Egan and Elga (2005), Kotzen (2013), Pollock (1987, 1995, and 2001), Pollock and Cruz (1999), and Pryor (2013). For a detailed discussion of defeaters of experiences, see Silins (2014).

<sup>20</sup> Dogmatism takes perceptual experiences to give us justification for beliefs about the external world in virtue of having phenomenal force. For defenses of this view, see Bengson (2015), Brogaard (2014 and 2016), Chudnoff (2011, 2012, 2013), Chudnoff and DiDomenico (2015), Huemer (2001, 2006, and 2007), Pryor (2000 and 2004), and Tucker (2010 and 2014 b).

As I see it, experiences provide us with justification for beliefs about the external world only when we do not fabricate them for ourselves. Since Sam's rain imagining is caused by his expectation through a semantically intelligible route, the generation of the imagining is attributable to Sam, and the imagining should count as an experience that Sam fabricates for himself. Moreover, I think that this is true even if Sam's imagining arises spontaneously and he is unaware of his expectation being the source. To see this point, consider that some belief inferences happen spontaneously and the subjects often lack awareness that they make these inferences. We nonetheless attribute the inferences to the subjects and take the quality of the inferences to affect the justificatory status of the inferred beliefs. Similarly, I doubt that spontaneity makes the generation of Sam's rain imagining not attributable to Sam. If the rain imagining is an experience that Sam fabricates for himself, then no matter what its phenomenal character is like, it should not give Sam justification for believing that it is raining.<sup>21</sup>

Now our analysis of the epistemology of imagining shows that etiology is important to the evidential force of an experience—an experience needs an appropriate etiology in order to justify. This point also applies to perceptual experiences. If a perceptual experience is partly fabricated by its subject, then this experience is also epistemically downgraded with respect to believing the relevant contents. I think that some cognitively penetrated perceptual experiences are partly fabricated by their subjects. In particular, I think that if Macpherson's mechanism is correct—that is, if some cognitively penetrated perceptual experiences have direct content and phenomenal contributions from both imagining and perception, then they are partly fabricated by their subjects, and therefore are epistemically downgraded with respect to believing the relevant contents.

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<sup>21</sup> For a more full-fledged version of this argument, see Teng (forthcoming) "Is Phenomenal Force Sufficient for Immediate Perceptual Justification?"

The next step of the Imagining Argument is to argue for this conclusion. I will focus on the Apple case. Recall that Macpherson's explanation of this case is: the participants' imagining contributed a red element, and their perception contributed an orange element, resulting in a red-orange experience. Was the content "The apple picture is red-orange" partly fabricated by the participants? I think that the answer is "Yes."

To see this point, compare the Apple case with a more sophisticated version of the Rain-Imagining case, in which Sam incorporates the scene of his environment—such as the setting of the street—into his experience as the backdrop for the rain. Although Sam's experience has direct content and phenomenal contributions from his perception, "It is raining on the street" is partly fabricated by Sam because it also has direct content and phenomenal contributions from Sam's cognitively driven imagining. In the Apple case, the participants' cognitively driven imagining directly contributed to the content "The apple picture is red-orange." By analogy, this content is also partly fabricated by the participants, and hence gives them less justification than an unpenetrated red-orange apple experience.

One might point out that in the more sophisticated rain case, Sam's imagining barely interacts with his perception, but according to Macpherson's explanation of the Apple case, the participants' experience resulted from an imagining-perception interaction. One might wonder whether such an interaction could make "The apple picture is red-orange" a content that was given to the participants rather than a content that was partly fabricated by them. This urges us to compare the Apple case with some other cases, in which the experiences result from imagining-perception interactions.

As I see it, the two cases from Segal's experiments, which we introduced to show that the second step of Macpherson's mechanism could independently occur, are good candidates:

**Manhattan:** The participants were asked to imagine a city skyline, while unbeknownst to them, a faint red tomato was projected onto the screen where they fixated. Several participants reported that they had an image of Manhattan at sunset.

**Tomato:** The participants were seated under a vinyl hood and asked to imagine a tomato. They reported the tomato as red when, unbeknownst to them, a faint red tomato was projected onto the surface of the hood, whereas they reported the tomato as “shaded or dirty” red, as “shiny,” as a “homegrown” tomato when a faint beer was projected.

In the Manhattan case, “Manhattan is at sunset” seemed to result from an interaction between the participants’ imagining and perception. So did the content “There is a dirty red tomato” in the Tomato case. Did the imagining-perception interactions make “Manhattan is at sunset” or “There is a dirty red tomato” a content that was not fabricated by the participants? I do not think so. This is because the participants’ cognitively driven imaginings directly contributed to these contents, and the imagining-perception interactions did not eliminate this fact. Similarly, in the Apple case, although the participants’ imagining interacted with their perception to produce “The apple shape is red-orange,” the interaction did not eliminate the fact that the participants’ cognitively driven imagining directly contributed to this content. So the content was also partly fabricated by the participants, and was epistemically downgraded.

So far, I have completed the Imagining Argument for the Downgrade Thesis. Before ending this section, let’s consider the following question: if perceptual experiences have determinable color contents like “It is orange” in addition to determinate color contents like “It is red-orange,” then in the Apple case, was the participants’ experience epistemically downgraded

with respect to believing that the apple picture is orange? I answer this question by pointing out that the Downgrade Thesis only applies to contents that are fabricated by their subjects. If in the Apple case, the participants' perception alone contributed to the content "The apple picture is orange," then this content was not fabricated by the participants and the experience was not epistemically downgraded with respect to believing this content.

## 5. Good Cases of Cognitive Penetration

So far we have focused on bad cases of cognitive penetration. However, one might point out that there seems to be good cases of cognitive penetration, in which the resulting perceptual experiences are not epistemically downgraded.

**Pine Tree:** When a tree expert looks at a pine tree, his expertise makes him see it as a pine tree. This experience seems to give the expert no less justification for believing that it is a pine tree than an unpenetrated perceptual experience.<sup>22</sup>

**Snake:** Smith is hiking and fears that there are snakes nearby. The fear makes him more sensitive to snakes. When he looks at some grass, he detects a snake he would not detect without the fear. This experience seems to give Smith no less justification for believing that there is a snake in the grass than an unpenetrated perceptual experience.<sup>23</sup>

Can our approach explain these cases? At least on the face of it, we encounter a problem: if a content of a cognitively penetrated perceptual experience is directly caused by a cognitively driven imagining through a semantically intelligible route, then that content, according to the

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<sup>22</sup> See Siegel (2012) and (2013 a).

<sup>23</sup> See Lyons (2011).

Imagining Argument, is at least partly fabricated by its subject and is epistemically downgraded. However, as I pointed out earlier, Macpherson's mechanism focuses on one kind of imagining-perception interactions—namely both experiences/processes directly contribute to the contents and phenomenal character of the resulting experience. There might be other kinds of imagining-perception interactions, which do not generate fabricated contents and which are consistent with Macpherson's mechanism. Moreover, there might be other mechanisms through which cognitive penetration takes place, and the Pine-Tree case and the Snake case might be explained by such a mechanism rather than Macpherson's.

Let me start with the latter point. As I mentioned earlier, there is evidence that object-based attention and feature-based attention can occur during perceptual processing, so cognitive effects on perceptual experiences through influencing these attentions can be genuine cases of cognitive penetration. It is entirely possible that the Pine-Tree case and the Snake case are cases like this. In the Pine-Tree case, the expert's expertise might make him attend to the distinctive features of the tree in front of him, and hence makes him recognize it as a pine tree. In the Snake case, Smith's fear might make him pay special attention to snakes (or their distinctive features), and hence makes him more sensitive to snakes in the grass.

The cognitively driven attentions in the Pine-Tree case and the Snake case do not make "It is a pine tree" or "There is a snake in the grass" fabricated contents by their subjects. Although the expert's cognitively driven attention influences his perceptual experience, it does so through making some features more salient to him. Just as cognitively driven spatial attention ordinarily makes some location more salient to their subjects without generating any fabricated contents, the expert's feature-based attention also does not make his experience fabricated. The experience can give him no less justification for believing that the tree is a pine tree than an unpenetrated

perceptual experience.<sup>24</sup> Similarly, Smith's object-based attention (or feature-based attention) just makes the snake in the grass (or its distinctive features) pop out. It does not make the experience fabricated. So the experience can give Smith no less justification for believing that there is a snake in the grass than an unpenetrated perceptual experience.

It is worth pointing out that I do not claim that attention-based perceptual experiences are always innocent. Consider the following version of the Apple case: when the participants looked at the apple picture, their cognitive states about the typical color of apples made them attend to the red component within the orange while ignoring the yellow component. As a result, they saw the picture as closer to red than its actual color. Siegel (2013 c) argues that such selection effects of attention can make the resulting perceptual experiences epistemically downgraded. If so, then an explanation might be: the participants' attention influenced their experience in such a way that "The apple picture is red-orange" becomes a fabricated content. Our analysis of the Pine-Tree case and the Snake case above does not rule out this possibility.

Let's turn to the point that there might be other kinds of imagining-perception interactions, which do not generate fabricated contents and which allows Macpherson's mechanism to explain some good cases of cognitive penetration. The findings of Perky and Segal led to a substantial body of research on imagining-perception interactions, some of which suggested that there are many commonalities between the representation mediums that are activated in imagining and those that are activated in perception (see Kosslyn 1980 and Finke 1980).<sup>25</sup> Such commonalities not only leave open the possibility that imagining can interfere with perception, as demonstrated

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<sup>24</sup> Although I think that having an appropriate etiology is a necessary condition for perceptual justification, I am not committed to any positive view of what constitutes a sufficient condition for perceptual justification in this paper. I use the expression "can give him no less justification" rather than "give him no less justification" in this sentence because I want to leave it open whether other conditions are needed in order to for the perceptual experience to justify.

<sup>25</sup> See Waller et al (2012) for a detailed literature review on the empirical research on imagining-perception interaction in the 20<sup>th</sup> century.



by the Perky effect, but also leave open the possibility that imagining can facilitate perception. For example, M. J. Farah (1985 and 1989) asked her participants to detect the presence of a faint letter H or T in a square while the participants projected a mental image of H or T onto the same location. It turned out that their detection was more accurate when they were imagining the same letter than a different one.

Moreover, J. Pearson et al (2008) demonstrated the imagining-perception facilitations by making use of binocular rivalry, the phenomenon that when dissimilar pictures are presented to one's two eyes at the same time, one is only aware of one picture at a time. In their experiment, Pearson et al presented the participants' left eyes with a green vertical grating and the right eyes with a red horizontal grating. They presented the pictures once about every 10 seconds, and the participants reported which of the pictures was dominant after each presentation. Under passive viewing, the participants tended to see the picture that was dominant in the previous trial. In the compared trials, Pearson et al. asked the participants to imagine one of pictures during the blank intervening period between presentations—either the dominant picture or the suppressed picture in the previous trial. The imagining of a given picture made the participants more disposed to see the same picture in the subsequent trial than under passive viewing, no matter whether the imagined picture was previously dominant or suppressed.<sup>26</sup>

The findings on the imagining-perception facilitations shed light on how Macpherson's mechanism might be expanded to explain some good cases of cognitive penetration. In some cognitive penetration, cognitive states trigger an imagining that does not directly contribute to the contents or phenomenal character of the resulting perceptual experience, but rather facilitates the perception of things in the external world. Because the role imagining plays in such cognitive

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<sup>26</sup> For further experiments on the facilitatory effects of imagining on perception, see Ishai and Sagi (1995 and 1997), Michelon and Koenig (2002), and Michelon and Zacks (2003).

penetration is to make one more ready to perceive things, the cognitive penetration does not generate fabricated contents and does not make the resulting perceptual experiences epistemically downgraded. I think that the Snake case could be a case like this: because Smith fears that there are some snakes nearby, he starts to imagine a snake or a scene that contains a snake as he hikes. This imagining makes him more ready to spot a snake in his environment.

Admittedly, the imagining-perception facilitations might not be able to explain all good cases of cognitive penetration. For example, the Pine-Tree case seems to be better explained by featured-based attention. Moreover, although a few experiments demonstrated the facilitatory effects of imagining on perception, much more empirical work needs to be done to reveal their nature. For example, how are these effects related to or different from the facilitatory effects of attention on perception? (Farah 1989 found that the facilitatory effects of imagining the letter H or T were qualitatively similar to the facilitatory effects of attending to H or T in a combination H-T stimulus; Pearson et al 2008, on the other hand, found no such similarity in the context of binocular rivalry.) Despite the limitation of the findings, our above analysis at least shows that Macpherson's mechanism has room for some good cases of cognitive penetration.

## **Conclusion**

The Downgrade Thesis claims that for some cognitively penetrated perceptual experiences, if they are cognitively penetrated to represent that P, then they are epistemically downgraded with respect to believing that P. In this paper, I argued for the Downgrade Thesis by developing Macpherson's mechanism of cognitive penetration: in cognitive penetration, some cognitive states trigger an imagining, which interacts with perception and contributes to the contents and phenomenal character of the resulting experiences. I argued that ordinary cognitively driven

imaginings do not give us justification because they are experiences that we fabricate for ourselves. Applying this point to cognitive penetration, I argued that some cognitively penetrated perceptual experiences are also partly fabricated by their subjects, and hence are epistemically downgraded with respect to believing the fabricated contents. So the Downgrade Thesis is true. Finally, I pointed out that Macpherson's mechanism allows other kinds of imagining-perception interactions, such as imagining-perception facilitations. I argued that such facilitations do not necessarily generate fabricated contents, and our approach can appeal to it to explain at least some good cases of cognitive penetration.

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## Bibliography

Bengson, J. (2015) "The Intellectual Given," *Mind*.

Brogaard, Berit (2014) "Phenomenal Seemings and Sensible Dogmatism" in C. Tucker (ed.) *Seemings and Justification*, New York: Oxford University Press: pp. 270-289.

----- (2016) "Staying Indoors: How Phenomenal Dogmatism Solves the Skeptical Problem without Going Externalist," in B. Coppenger and M. Bergmann (eds.) *Intellectual Assurance: Essays on Traditional Epistemic Internalism*, New York: Oxford University Press: pp. 85-104.

Bergmann, M. (2006) *Justification Without Awareness*, New York: Oxford University Press.

Brewer, W. F. (1974) "There is No Convincing Evidence for Operant or Classical Conditioning in Adult Humans," in W. B. Weimer and D. S. Palermo (Eds.), *Cognition and the Symbolic Process*, Hillsdale, NJ: Lawrence Erlbaum Associates.

Byrne, A. (2009) "Experience and Content," *Philosophical Quarterly* 59 (236): pp. 429-451.

Cecchi, A. S. (2014) "Cognitive Penetration, Perceptual Learning, and Neural Plasticity," *Dialectica* 68 (1): pp. 63-95.

Chudnoff, E. (2011) "What Intuitions Are Like," *Philosophy and Phenomenological Research* 82 (3): pp. 625-654.

----- (2012) "Presentational Phenomenology," in S. Miguens and G. Preyer (eds.), *Consciousness and Subjectivity*, Heusenstamm, Germany: Ontos Verlag.

----- (2013) *Intuition*, New York: Oxford University Press.

Chudnoff, E. and DiDomenico, D. (2015) "The Epistemic Unity of Perception," *Pacific Philosophical Quarterly* 96 (4): pp. 535-549.

Churchland, P. M. (1988) "Perceptual Plasticity and Theoretical Neutrality: A Reply to Jerry Fodor," *Philosophy of Science* 55 (2): pp. 167-187.

Clark, A. (2000) *A Theory of Sentience*, New York: Oxford University Press.

Craig, E. (1976) "Sensory Experience and the Foundations of Knowledge," *Synthese* 33 (8): pp. 1-24.

Deroy, O (2013) "Object-Sensitivity versus Cognitive Penetrability of Perception," *Philosophical Studies* 162 (1): pp. 87-107.

Dretske, F. (1981) *Knowledge and the Flow of Information*, Cambridge, MA: MIT Press.

- (1995) *Naturalizing the Mind*, Cambridge, MA: MIT Press.
- Egan, A. and Elga, A. (2005) "I Can't Believe I'm Stupid," *Philosophical Perspectives* 19: pp. 77-94.
- Farah, M. J. (1985) "Psychophysical Evidence for a Shared Representational Medium for Mental Images and Percepts," *Journal of Experimental Psychology* 114: pp. 91-103.
- (1989) "Mechanisms of Imagery-Perception Interaction," *Journal of Experimental Psychology: Human Perception and Performance* 15: pp. 203-211.
- Finke, R. A. (1980) "Levels of equivalence in imagery and perception," *Psychological Review* (87): pp. 113-132.
- Firestone, C. and Scholl, B. J. (2015). "Cognition does not affect perception: Evaluating the evidence for "top-down" effects," *Behavioral and brain sciences*: pp. 1-72.
- Fodor, J. (1984) "Observation Reconsidered," *Philosophy of Science* 51 (1): pp. 23-43.
- (1988) "A Reply to Churchland's 'Perceptual Plasticity and Theoretical Neutrality,'" *Philosophy of Science* 55 (2): pp. 188-198.
- Fumerton, R. (2013) "Siegel on the Epistemic Impact of 'Checkered' Experience," *Philosophical Studies* 162 (3): pp. 733-739.
- Ghijsen, H. (2016) "The Real Problem of Cognitive Penetration," *Philosophical Studies* 173 (6): pp. 1457-1475.
- Hansen T., Olkkonen, M., Walter, S., and Gegenfurtner, K. (2006) "Memory Modulates Color Appearance," *Nature Neuroscience* 9 (11): pp. 1367-1368.
- Hohwy, J. (2013) *The Predictive Mind*, New York: Oxford University Press.
- Huemer, M. (2001) *Skepticism and the Veil of Perception*, New York: Rowman and Littlefield Publishers, Inc.
- (2006) "Phenomenal Conservatism and the Internalist Intuition," *American Philosophical Quarterly* 43 (2): pp. 147-158.
- (2007) "Compassionate Phenomenal Conservatism," *Philosophy and Phenomenological Research* 74 (1): pp. 30-55.
- (2013) "Epistemological Asymmetries between Belief and Experience," *Philosophical Studies* 162 (3): pp. 741-748.
- Ishai, A. and Sagi, D. (1995) "Common Mechanisms of Visual Imagery and Perception," *Science*

268: pp. 1772–1774.

-----(1997) “Visual Imagery Facilitates Visual Perception: Psychophysical Evidence,” *Journal of Cognitive Neuroscience* 9: pp. 476–489.

Kosslyn, S. M. (1980) *Image and mind*, Cambridge, MA: Harvard University Press.

Kotzen, M. (2013) “Multiple Studies and Evidential Defeat” *Nous* 47 (1): pp. 154-180.

Lyons, J. (2011) “Circularity, Reliability, and the Cognitive Penetrability of Perception,” *Philosophical Issues* 21(1): pp. 289-311.

Macpherson, F. (2012) “Cognitive Penetration of Color Experience: Rethinking the Issue in Light of an Indirect Mechanism,” *Philosophy and Phenomenological Research* 84 (1): pp. 24–62.

Martin, M. G. F. (1992) “Perception, Concepts and Memory,” reprinted in Y. Gunther (ed.), *Essays in Non-Conceptual Content*, Cambridge, MA: MIT Press.

Massaro, D. W. (1998) *Perceiving Taking Faces: From Speech Perception to a Behavioral Principle*, Cambridge, MA: MIT Press.

-----(1999) “Speech Reading: Illusion or Window into Pattern Recognition,” *Trends in Cognitive Sciences* 3 (8): pp. 310-317.

McDowell, J. (1994) “The Content of Perceptual Experience,” *Philosophical Quarterly* 44 (175): pp. 190-205.

McGrath, M. (2013 a) “Siegel and the Impact for Epistemological Internalism,” *Philosophical Studies* 162 (3): pp. 723-732.

----- (2013 b) “Phenomenal Conservatism and Cognitive Penetration: the ‘Bad Basis’ Counterexample,” in C. Tucker (ed.) *Seemings and Justification*, New York: Oxford University Press.

Michelon, P. and Koenig, O (2002) “On the Relationship between Visual Imagery and Visual Perception: Evidence from Priming Studies,” *European Journal of Cognitive Psychology* 14 (2): pp. 161-184.

Michelon, P. and Zacks, J. (2003) “What is Primed in Priming from Imagery?” *Psychological Research* 67 (2): pp. 71-79.

Mole, C. (2015) “Attention and Cognitive Penetration,” in A. Raftopoulos and J. Zeimbekis (eds.), *Cognitive Penetration*, New York: Oxford University Press.

Neisser, U. (1976) *Cognition and Reality*, San Francisco: W. H. Freeman.

- Olkkonen, M., Hansen, T., and Gegenfurtner, K. (2008) "Color Appearance of Familiar Objects: Effects of Object Shape, Texture, and Illumination Changes," *Journal of Vision* 8 (5): pp. 1-16.
- Pautz, A. (2010) "Why Explain Visual Experience in Terms of Content?" in B. Nanay (ed.), *Perceiving the World*, New York: Oxford University Press.
- Peacocke, C. (1983) *Sense and Content*, New York: Oxford University Press.
- (1992) *A Study of Concepts*, Cambridge, MA: MIT Press.
- (2001) "Does Perception Have a Nonconceptual Content?" *Journal of Philosophy* 98 (5): pp. 239-64.
- Pearson, J., Clifford, C. W. G., and Tong, F. (2008) "The Functional Impact of Mental Imagery on Conscious Perception," *Current Biology* 18 (13): pp. 982-986.
- Perky, C. W. (1910) "An Experimental Study of Imagination," *American Journal of Psychology* 21: pp. 422-452.
- Pollock, J (1987) "Defeasible Reasoning," *Cognitive Science* 11: pp. 481-518.
- (1995) *Cognitive Carpentry*, Cambridge: MIT Press.
- (2001) "Defeasible Reasoning with Variable Degree of Justification," *Artificial Intelligence* 133: pp. 233-282.
- Pollock, J. and Cruz, J. (1999) *Contemporary Theories of Knowledge*, Rowman and Littlefield.
- Pryor, J. (2000) "The Skeptic and the Dogmatist," *Noûs* 34 (4): pp. 517-549.
- (2004) "What's Wrong with Moore's Argument?" *Philosophical Issues* 14 (1): pp. 349-378.
- (2013) "Problems for Credulism," in C. Tucker (ed.) *Seemings and Justification*, New York: Oxford University Press.
- Pylyshyn, Z. W. (1999) "Is Vision Continuous with Cognition? The Case for Cognitive Impenetrability of Visual Perception," *Behavioral and Brain Sciences* 22 (3): pp. 341-365.
- Raftopoulos, A. (2001) "Is Perception Informationally Encapsulated? The Issue of the Theory-Ladenness of Perception," *Cognitive Science* 25: pp. 423-451.
- Segal, S. J. (1971) "Processing of the Stimulus in Imagery and Perception," in S. J. Segal (ed.), *Imagery: Current Cognitive Approaches*, New York: Academic Press.
- (1972) "Assimilation of a Stimulus in the Construction of an Image: The Perky Effect

Revisited,” in P. W. Sheehan (ed.), *The Function and Nature of Imagery*, New York and London: Academic Press.

Sedivy, S. (1996) “Must Conceptually-informed Experience Involve Non-conceptual Content?” *Canadian Journal of Philosophy* 26 (3): pp. 413–31.

Siegel, S. (2006) “Which Properties are Represented in Perception?” in T. S. Gendler and J. Hawthorne (eds.), *Perceptual Experience*, New York: Oxford University Press.

----- (2010 a) “Do Experiences Have Contents?” In B. Nanay (ed.), *Perceiving the World*, New York: Oxford University Press.

----- (2010 b) *The Contents of Visual Experience*, New York: Oxford University Press.

----- (2012) “Cognitive Penetrability and Perceptual Justification,” *Nous* 46 (2): pp. 201-222.

----- (2013 a) “The Epistemic Impact of the Etiology of Experience,” *Philosophical Studies* 162 (3): pp. 697-722.

----- (2013 b) “Reply to Fumerton, Huemer, and McGrath,” *Philosophical Studies* 162 (3): pp. 749-757.

----- (2013 c) “Can Selection Effects on Experience Influence its Rational Role?” In T. S. Gendler (ed.), *Oxford Studies in Epistemology: Volume 4*, New York: Oxford University Press.

----- (forthcoming) *The Rationality of Perception*, New York: Oxford University Press.

Siewert, C. (1998) *The Significance of Consciousness*, Princeton: Princeton University Press.

Silins, N. (2014) “The Agony of Defeat,” *Philosophy and Phenomenological Research* 88(3): pp. 505-532.

Slade, P. D. and Bentall, R. P. (1988) *Sensory Deception: Towards a Scientific Analysis of Hallucinations*, London: Croom Helm.

Stokes (2013) “Cognitive Penetrability of Perception,” *Philosophy Compass* 8 (7): pp. 646-663.

Teng, L. (forthcoming) “Is Phenomenal Force Sufficient for Immediate Perceptual Justification?” *Synthese*.

Tucker, C. (2010) “Why Open-Minded People Should Endorse Dogmatism,” *Philosophical Perspectives* 24 (1): pp. 529-545.

----- (2013) “Seemings and Justification: An Introduction,” in C. Tucker (ed.) *Seemings and Justification*, New York: Oxford University Press.



----- (2014) "If Dogmatists Have a Problem with Cognitive Penetration, You Do Too," *Dialectica* 68 (1): pp. 35-62.

Tye, M. (1995) *Ten Problems of Consciousness*, Cambridge, MA: MIT Press.

Waller, D., Schweitzer, J., Brunton, R. and Knudson, M. "A Century of Imagery Research: Reflections on Cheves Perky's Contribution to Our Understanding of Mental Imagery," *The American Journal of Psychology* 125 (3): pp. 291-305.

Walton, K. L. (1990) *Mimesis as Make-Believe: On the Foundations of the Representational Arts*, Cambridge, MA: Harvard University Press.

Witzel, C., Valkova, H., Hansen, T., and Gegenfurtner, K. R. (2011) "Object Knowledge Modulates Color Appearance," *i-Perception* 2(1): p. 13.

Wu, W. (forthcoming) "Shaking Up the Mind's Ground Floor: The Cognitive Penetration of Visual Attention," *Journal of Philosophy*.

Vahid, H (2014) "Cognitive Penetration, the Downgrade Principle, and Extend Cognition," *Philosophical Issues* 24 (1): pp. 439-459.

Vance, J. (2014) "Emotion and the New Epistemic Challenge from Cognitive Penetrability," *Philosophical Studies* 169 (2): pp. 257-283.

Vetter, P. and Newen, A. (2014) "Varieties of Cognitive Penetration in Visual Perception," *Consciousness and Cognition* 27: pp. 62-75.

Yeh, S. and Chen, I. (1999) "Is Early Visual Processing Attention Impenetrable?" *Behavioral and Brain Sciences* 22 (3): pp. 400-400.