

THE MICROSTRUCTURE OF EXPERIENCE

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ABSTRACT:

I argue that experiences can have microphenomenal structures, where the macrophenomenal properties we introspect are realized by non-introspectible microphenomenal properties. After explaining what it means to ascribe a microstructure to experience, I use empirical considerations to defend the thesis against its principal philosophical challenge, discuss how the thesis interacts with other philosophical issues about experience, and consider our prospects for investigating the microphenomenal realm.

§ 0 | INTRODUCTION¹

When we think about the structure of the physical world, we distinguish the macrophysical realm from the microphysical realm. We take the *macrophysical* properties we perceive with the naked eye (or ear, nose, tongue, etc.) to be realized by *microphysical* properties beyond our perceptual grasp. Putting it another way, we take the physical world to have a *microstructure*.

Though this picture of the physical world is now familiar, it has not always been obvious. For a theorist of antiquity, ascribing a microstructure to the physical world would have been a radical and speculative hypothesis. Perception alone reveals only the physical world's macrostructure. To investigate its microstructure, we had to develop experimental methods, theoretical frameworks, and technology that enable us to discover more than what our bare perceptual capacities reveal.

Our perceptual capacities put us in contact with physical properties of the external world. Our introspective capacities, on the other hand, put us in contact with phenomenal properties of our own experiences. But whereas the idea that the physical world has a microstructure is now taken for granted, the idea that our own experiences might have microstructures is widely dismissed. What would it even mean for the phenomenal properties we introspect to be realized by non-introspectible microphenomenal properties? The following quote from Barry Dainton illustrates this skepticism:

¹ I am deeply grateful to David Chalmers for comments and discussion across numerous drafts of this paper. I am also thankful for helpful comments and discussions with Ned Block, Kyle Blumberg, Philip Goff, Grace Helton, Daniel Hoek, Ben Holguín, Pierre Jacob, Uriah Kriegel, Harvey Lederman, Geoffrey Lee, Robert Long, Hedda Hassel-Mørch, Daniel Muñoz, Thomas Nagel, Luke Roelofs, Peter Unger, two anonymous referees, and audiences at the City University of New York, Institut Jean Nicod, and New York University.

[T]here is no reason to think phenomenal objects decompose into anything akin to the micro-constituents of ordinary physical objects...The only phenomenal parts possessed by a phenomenal object are those that are manifest in the experience itself....since phenomenological inquiry is restricted to the level of appearances.²

According to philosophical orthodoxy, experiences are not the kinds of things that can have microstructures. It is often claimed that there is no appearance-reality distinction for experiences, which seems to leave no room for a non-introspectible realm of microphenomenal properties. In fact, it is hard to even find explicit arguments against the idea of microphenomenal structure, for the impossibility of such a view is often taken to be more or less self-evident.³

The central thesis of this paper is that experiences can have microphenomenal structures. To defend this claim, I argue that the following hypothesis is philosophically defensible:

MICROSTRUCTURE: Our experiences have microphenomenal structure.

Whether or not MICROSTRUCTURE is true is a largely empirical matter, and I will later argue that we do not yet have the tools for empirically evaluating the hypothesis. But I believe that the philosophical grounds for dismissing it are weak and that the hypothesis deserves serious exploration. Moreover, recognizing

² Dainton [2000].

³ Some philosophers have discussed MICROSTRUCTURE in the context of panpsychism (e.g., Strawson [2008], Chalmers [2015], and Goff [2017]). Those discussions overlap with some of the issues discussed in this paper, but the aims and scope are different. This paper focuses on MICROSTRUCTURE as a thesis about the structure of experience, independent of its relation to issues about the mind-body problem. Nevertheless, one reason for caring about the philosophical defensibility of MICROSTRUCTURE is that it is entailed by certain versions of panpsychism. In §3, I explain the points of intersection and independence between MICROSTRUCTURE and panpsychism in more detail.

MICROSTRUCTURE as a live option has important ramifications for consciousness research. Not only does it challenge our conventional assumptions about the structure of experience, but it also has implications for issues such as which phenomenal properties are fundamental, what the physical correlates of experience might be, the science of consciousness, and the limits of introspection.

In §1, I characterize what it would mean for our experiences to have microphenomenal structures. In §2, I address the principal challenge for MICROSTRUCTURE: namely, the claim that subjects can know the phenomenal realizers of the experiences they introspect. In §3, I discuss specific versions of MICROSTRUCTURE and how the thesis relates to other issues about experience. In §4, I consider our prospects for investigating the microphenomenal realm.

§ 1 | MICROSTRUCTURE

What is it for a domain to have a microstructure? In brief: the observable macroproperties of the domain are realized by unobservable microproperties of that domain. It is easy to see how our default picture of the physical world satisfies this criterion: the macrophysical properties of tables, chairs, and watermelons are realized by microphysical properties of molecules, atoms, and particles. This section articulates what it means to ascribe a microstructure to experiences.

MICROPHENOMENAL PROPERTIES

A *phenomenal property* is a property that characterizes⁴ the phenomenal character of an experience.⁵ In other words, phenomenal properties are the subjective, qualitative properties that characterize what it is like to have that experience. If our experiences have microphenomenal structure, then the macrophenomenal properties we introspect (such as the properties characterizing

⁴ Note that characterization is a different relation than constitution. For example, a physicalist might think that the molecular properties of a subject's brain constitute (but do not characterize) a subject's experiences. See Goff [2017] for discussion of this distinction.

⁵ I will be neutral between understanding properties as universals versus as particulars.

color experiences, pains, and so forth) are realized by non-introspectible microphenomenal properties.

What is it for a property to be microphenomenal? To answer this question, it is useful to first think about what it is for a property to be *microphysical*. The obvious criterion is that microphysical properties are unobservable via our basic perceptual capacities. But while this condition is necessary, it is not sufficient. There are many physical properties, such as some of those of large electromagnetic fields or of physical objects outside of our light cone, that are imperceptible but need not be microphysical. The other criterion needed is that microphysical properties also realize the macrophysical properties we perceive. By analogy, *microphenomenal properties* are non-introspectible phenomenal properties that realize the macrophenomenal properties we introspect.

Some might argue that a third criterion on microproperties is that they are properties of small entities. After all, the canonical examples of microphysical properties are properties of particles, atoms, and molecules. However, there are two reasons that favor leaving out size constraints in the characterization of microproperties. First, large entities also have microproperties. For example, the property that characterizes the precise atomic configuration of the Earth at this moment is a microphysical property of the Earth. Second, it is unclear how to apply the notion of size to experiences. The sense in which my visual experience of a particular object is “smaller” than my total visual experience is arguably distinct from the notion of size we apply to physical objects. For these reasons, I believe it is best to leave out size requirements in the characterization of microproperties.

INTROSPECTION

We can take *introspection* to be the first-person knowledge acquisition process by which we form judgments about our own experiences.⁶ This

⁶ For those skeptical that there is any single proprietary process by which we form judgments about our own experiences, we can instead talk about whatever set of processes ‘introspection’ denotes.

characterization is largely neutral, leaving open a range of views about the nature and mechanisms of introspection. For our purposes, it also does not matter much whether we take the objects of introspection to be experiences, phenomenal properties, or phenomenal facts. And while I sometimes draw analogies between introspection and perception, that should not be taken to suggest that introspection is a kind of inner perception. More generally, my claims are consistent with holding that there are important epistemic asymmetries between perception and introspection. For example, even if one accepts that our experiences have microphenomenal realizers, one could still think that introspection is immune to certain kinds of error that perception is susceptible to (such as illusions and hallucinations).

Whereas introspection is a type of knowledge acquisition process, *introspectibility* is a matter of being able to acquire that knowledge on the basis of introspection. Some have been tempted to think that properties that characterize what it is like to have an experience are coextensive with properties that are introspectible. But that is a substantive theoretical commitment, since introspectibility and phenomenality are specified by different theoretical roles. In particular, a property is phenomenal just in case it characterizes what it is like to have an experience, while a property is introspectible by a subject just in case that subject can know when that phenomenal property is instantiated. In §2, I discuss some cases showing how phenomenal character comes apart from introspectibility.

Now we are in a better position to understand what demarcates the micro-macro boundary. In the case of the physical world, the boundary between the microphysical and macrophysical is fixed by the actual perceptual capacities of normal humans. In the case of experience, the boundary between the microphenomenal and macrophenomenal is fixed by the actual introspective capacities of normal humans. In both cases, the micro-macro distinction tracks the kinds of properties that normal humans are actually sensitive to. And in both cases, it is plausible that the boundary is vague and does not pick out a joint in nature. In fact, in §2, I discuss some examples of phenomenal properties that may lie in the borderline region between microphenomenal and macrophenomenal.

All this is consistent with the possibility that microphenomenal properties are introspectible in principle. Even though microphysical properties are imperceptible, we can imagine creatures (or enhanced humans) with perceptual capacities that enable the perception of microphysical properties. In §4, I discuss the analogous possibility of creatures (or enhanced humans) with introspective capacities that enable the introspection of microphenomenal properties.

APPEARANCE AND REALITY

If there is no appearance-reality distinction for experiences, then there is a puzzle about how to make sense of microphenomenal properties. In the case of the physical world, it is natural to think of microphysical properties as not appearing to us at all. But if we are interested in appearances themselves, then it does not make sense to talk about appearance properties that do not appear to us at all. Yet that seems to be what microphenomenal properties must be. How do we solve this puzzle?

The puzzle equivocates on the term ‘appearance’. On the one hand, we could understand ‘appearance’ in a phenomenal sense, where appearances are a matter of phenomenal character. Under this interpretation, it does not make sense to talk about phenomenal properties that do not appear in any way to their subject. But MICROSTRUCTURE does not entail an appearance-reality distinction in this sense, since microphenomenal properties characterize the phenomenal character of a subject’s experience. On the other hand, we could understand ‘appearance’ in an epistemic sense, where appearances are a matter of the judgments a subject is inclined to make. MICROSTRUCTURE entails an appearance-reality distinction in this sense, since a subject’s having a certain experience does not guarantee that the subject makes the right judgments about that experience. But there is no contradiction here, since it is false that there is no appearance-reality distinction for experiences in this sense. The puzzle about appearances is deflated once we distinguish these two different senses of ‘appearance’.

At the same time, the puzzle points to one of the disanalogies between microphenomenal properties and microphysical properties. Whereas microphysical

properties do not make a difference to our experiences at all (in that they do not figure into the contents of our experiences), microphenomenal properties do make a difference to our experiences (in that they partially characterize the phenomenal character of our experiences). Nevertheless, microphenomenal properties can still satisfy the theoretical role associated with microscopic properties discussed previously: namely, being non-introspectible phenomenal properties that realize the macrophenomenal properties we introspect.

AN ANALOGY

Some might still find it hard to understand how non-introspectible phenomenal properties could contribute to the phenomenal character of experience. Perhaps an analogy might help: Think about a series of photographic layers superimposed on top of each other that collectively form an image. Each layer makes its own individual contribution to the character of the image—some layers add a certain texture, some add a certain shade of color, and so on. Since the layers are stacked on top of each other, they are seamlessly blended together. When we perceptually observe the image, we do not discern the individual layers; rather, we see a unified image. Nevertheless, each layer contributes to how the image appears to us. If a layer were removed, our perceptual experience would change.⁷ Analogously, microphenomenal properties might each make their own individual contribution to the overall phenomenal character of our experience, even though we may be unable to introspectively individuate microphenomenal properties when they are combined with other microphenomenal properties.

PHILOSOPHICAL MOTIVATIONS

Is there positive reason for endorsing MICROSTRUCTURE? I mentioned that MICROSTRUCTURE is an empirical thesis that we are not yet in a position to assess.

⁷ Similar examples would also work with other kinds of sensory modalities. Consider, for example, a sound sample with multiple layers, a culinary dish with a variety of subtle flavors, or a perfume containing a complex blend of scents.

At the same time, there may be some philosophical motivations for MICROSTRUCTURE. In what follows, I briefly mention some of these motivations. However, since my main goal is to show that MICROSTRUCTURE is coherent and philosophically defensible, I will not discuss these motivations in detail.

First, MICROSTRUCTURE renders certain views about the mind-body problem more plausible. Most notably, MICROSTRUCTURE is entailed by constitutive panpsychism, the view that fundamental physical entities have microexperiences that constitute the macroexperiences of macrosubjects. I discuss the relationship between MICROSTRUCTURE and panpsychism in more detail in §3. More generally, MICROSTRUCTURE strengthens any view about the mind-body problem that takes phenomenal properties to correspond to relatively low-level physical properties.

On a related note, MICROSTRUCTURE may help solve the grain problem, or the problem of explaining the mismatch between the structure of our experiences (as revealed by introspection) and the structure of the physical correlates of experience. For example, our experiences seem to sometimes have continuous structures while the physical correlates of experience seem to have discrete structures. This discrepancy in structure is puzzling, especially for theories that entail that the structure of an experience cannot outstrip the structure of its physical correlates. But if MICROSTRUCTURE is true, then our experiences might turn out to have discrete structures at the microphenomenal level, even if introspection leads us to believe that our experiences have continuous structures.⁸

MICROSTRUCTURE also has implications for phenomenal similarity. When two experiences are phenomenally similar, they must be similar in virtue of sharing some phenomenal properties. But there are cases where we have reason to think that two experiences are similar even though they do not seem to share any macrophenomenal properties. For example, one class of such examples is crossmodal correspondences, or associations between seemingly unrelated basic sensory features across different sensory modalities (e.g., bright objects and high pitches). A natural

⁸ There are different formulations of the grain problem, each of which generates somewhat different issues. See Lockwood [1993] for a classic discussion of the problem.

hypothesis is that crossmodally paired experiences are phenomenally similar.⁹ But this hypothesis is tenable only if MICROSTRUCTURE is true, since crossmodally paired experiences seem to have no macrophenomenal properties in common.

Perhaps the most intriguing philosophical motivation for MICROSTRUCTURE is that it opens up the possibility for SMALL-PALETTE, the thesis that there is a small number of fundamental phenomenal properties. I discuss the relationship MICROSTRUCTURE and SMALL-PALETTE in more detail in §3.

§ 2 | STRUCTURE LUMINOSITY

Philosophers have largely been skeptical of MICROSTRUCTURE, often assuming that experiences cannot have microstructures. The principal basis for this skepticism is epistemological. While it is common knowledge that the way the physical world really is need not be the same as the way it appears, it may be puzzling how to draw such a distinction for experiences. The following quote from Philip Goff illustrates the sentiment behind this skepticism:

Surely, you know exactly what your pain is—what it is for someone to feel pained in precisely that way—just by attending to pain and thinking about [it] in terms of how it feels. There is nothing in any way hidden from you about the reality of how you’re feeling...And that’s because the feeling is “right there” for you.¹⁰

Is there a principle that can provide the basis for an epistemological challenge against MICROSTRUCTURE? At first pass, the challenge seems to be motivated by LUMINOSITY, the thesis that if a subject has an experience, then that

⁹ See Marks [1987] for a well-known experimental study on audio-visual correspondences, Spence [2011] for a general overview of crossmodal correspondences, and Parise [2016] for a discussion of experimental paradigms and current issues. Notably, some researchers (such as Marks [1987]) have used the term “crossmodal similarities” to denote the phenomenon.

¹⁰ Philip Goff, *Consciousness and Fundamental Reality* [2017]

subject is in a position to know all phenomenal facts about that experience.¹¹ However, LUMINOSITY has been challenged on a variety of grounds. For example, Block [1995, 2011] argues that there are limits to our cognitive access to our experiences, Williamson [2001] argues that there are no phenomenal states such that whenever one is in that state, one is always in a position to know one is in that state, and Schwitzgebel [2008] argues that ordinary introspection is unreliable. These and other considerations have rendered LUMINOSITY a controversial thesis that many contemporary philosophers reject.

Since MICROSTRUCTURE has been widely dismissed, LUMINOSITY is too controversial to capture the challenge to MICROSTRUCTURE. Instead, we need a more targeted thesis:

STRUCTURE LUMINOSITY: If a subject introspects an experience, then that subject is in a position to know the phenomenal realizers of that experience.

To know the phenomenal realizers of an experience is to know which experiences realize that experience.¹² For example, my total perceptual experience is realized by my visual experience, auditory experience, and so forth. According to STRUCTURE LUMINOSITY, introspecting my total perceptual experience puts me in a position to know that it is realized by my different sensory experiences. And if an experience has no phenomenal realizers, then it is natural to take STRUCTURE LUMINOSITY to entail that we are in a position to know that.

STRUCTURE LUMINOSITY is more modest than LUMINOSITY. It is restricted to facts about which experiences realize other experiences, rather than ranging over all phenomenal facts. And it is restricted to experiences that subjects introspect,

¹¹ LUMINOSITY is sometimes cast as SELF-INTIMATION. The formulation of LUMINOSITY stated here differs slightly from the canonical formulation from Williamson [2000], though the differences do not matter for the purposes of this paper.

¹² The characterization could also be put in terms of properties, where to know the phenomenal realizers of phenomenal property is to know which phenomenal properties realize that phenomenal property.

rather than ranging over all experiences. These qualifications enable us to set aside traditional objections to LUMINOSITY, which largely concern non-ideal conditions for introspection, such as introspection of experiences outside the focus of one's attention, or in the periphery of one's visual field, or in comparison to extremely similar experiences. Since STRUCTURE LUMINOSITY is immune to some of the traditional objections against LUMINOSITY, it is a more defensible thesis.

At the same time, STRUCTURE LUMINOSITY precisely targets the most counterintuitive consequence of MICROSTRUCTURE: namely, that even in the best conditions for introspection, our experiences can have more structure than what we can introspect. Here is the basic argument:

[P1] If a subject introspects an experience, then that subject is in a position to know the phenomenal realizers of that experience.

[P2] If MICROSTRUCTURE is true, then our experiences have microphenomenal realizers.

[P3] Introspecting our experiences does not put us in a position to know that our experiences have microphenomenal realizers.

[C] MICROSTRUCTURE is false.

The first premise is STRUCTURE LUMINOSITY. The second premise follows from the definition of MICROSTRUCTURE. And the third premise is justified by basic introspection and the definition of microphenomenal realizers. I believe this argument captures the principal challenge to MICROSTRUCTURE.

However, the argument is unsound because STRUCTURE LUMINOSITY is false. The best way to see why it is false is by appeal to some empirical considerations. In what follows, I present three cases against STRUCTURE LUMINOSITY.¹³

¹³ See Roelofs [2014] for discussion of some of these same cases in a different (though related) context: namely, in regard to the palette problem for Russellian monism.

1. PAIN ASYMBOLIA

Do you know how your pain experiences are structured? Most people, when introspecting their pains, are inclined to think that pain is a simple phenomenal property. But pain asymbolia, a condition caused by damage to the posterior insula of the brain's cortex [Grahek 2007], indicates otherwise. Pain asymbolics report experiencing pain sensations without feeling motivated to stop those sensations. For example, if a pain asymbolic's hand is placed in a bucket of ice water or on a hot stove, they will report experiencing the same pain sensations they felt prior to their brain damage, but without the unpleasantness. Similar reports occur with patients on morphine.

The standard explanation of these phenomena is that pain experience has two separable components: a sensory component (corresponding to the pain sensation) and an affective component (corresponding to the unpleasantness). This view takes the reports of pain asymbolics at face value, and has been defended by both philosophers and scientists.¹⁴ The idea is that the pain experiences of pain asymbolics retain the sensory component while lacking the affective component. Because of this, they do not feel the immediate motivation to withdraw from painful stimuli, even though stimulation of their nociceptors still causes them to feel sensations. Figure 1 illustrates this structured model of the structure of pain experience:

¹⁴ See Grahek [2007] for a comprehensive scientific and clinical discussion of pain asymbolia. See Kupers et al [1991] for evidence of similar reports from morphine patients. For defenses of the structured model of pain experience, see Dennett [1978], Hardcastle [1997], Price [2000], and Grahek [2007]. For a recent criticism of this interpretation, see Klein [2015]. Note that in order for one to defend structure luminosity, one must not only establish that the structured model is false, but also that we were in a position to know it is false solely on the basis of introspection.

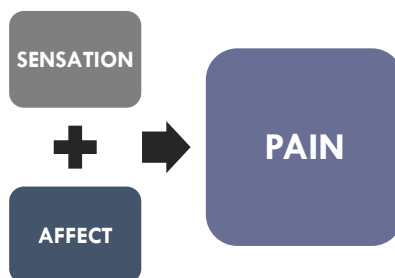


FIGURE 1: The structured model of pain experience.

If STRUCTURE LUMINOSITY is true, then subjects are in a position to know the phenomenal realizers of their pain experiences. But even though pain experiences are both salient and ubiquitous, we did not learn about their structure until evaluating the evidence from pain asymbolics.¹⁵ As Grahek [2007] puts it, even though “pain appears to be simple, homogenous experience,” its components “can become disconnected and therefore, much to our astonishment, they can exist separately.” Consequently, STRUCTURE LUMINOSITY is false.

2. PIXEL MOSAIC

Take a look at the pixel mosaic below:

¹⁵ The structured model of pain experience is corroborated by another case involving a patient with a post-central lesion, where stimulation of the patient’s hand caused him to report experiencing a sensation that was not painful but was “clearly unpleasant” and which he “wanted to avoid”. The researchers investigating this patient have argued that this is a case where the affective component of pain experience was present in the absence of the sensory component. Taken along with pain asymbolia, this is evidence of a double dissociation between the two components of pain. See Ploner, Freund, and Schnitzler [1999] for the reports and discussion of this case.

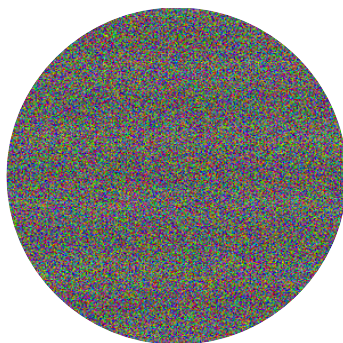


FIGURE 2: A pixel mosaic.

Consider your visual experience as you stare at the center of the pixel mosaic. Your overall visual experience of the pixel mosaic is realized by numerous local visual experiences corresponding to different parts of the pixel mosaic. But it is unlikely that introspecting your visual experience will put you in a position to identify those phenomenal realizers. Even if you are able to know some determinable facts about those phenomenal realizers, such as the fact that they each represent arrays of pixels, you are unlikely to be able to identify precisely which local visual experiences realize your overall visual experience. Hence, you are not in a position to know the phenomenal realizers of your overall visual experience of the pixel mosaic.

Some might argue that you are in a position to identify each individual phenomenal realizer, even if you are not in a position to know the total collection that realizes your overall visual experience. But even such piecemeal knowledge is arguably unattainable. Can you tell what color your visual experience represents the pixel at the leftmost part of the mosaic, whether each individual phenomenal realizer is stable over time or slightly changing in character as your attention shifts, or even what the most basic phenomenal realizers are in this case? Speaking for myself, no matter how hard I try to introspect, I do not know the answers to these questions. Even if you have excellent introspective abilities, you are unlikely to be able to distinguish the maximally determinate phenomenal properties characterizing your current experiences from the other nearby maximally determinate phenomenal properties that represent different configurations of pixels.

The upshot is that you are not in a position to know the phenomenal realizers of your visual experience of the pixel mosaic. Consequently, STRUCTURE LUMINOSITY is false.

3. FLAVOR EXPERIENCE

When you have a flavor experience, are you in a position to identify its gustatory and olfactory realizers? Consider, for example, the flavor experiences induced by “ripe mangoes, fresh figs, lemon, canteloupe melon, raspberries ... green olives, ripe persimmon, onion, caraway, parsnip, peppermint, aniseed, cinnamon, fresh salmon.”¹⁶ Even careful introspection does not reveal what the phenomenal realizers of those experiences are. In fact, oftentimes flavor experiences might seem simple and unstructured. This point is well articulated by Smith [2013] when he says that even though flavor perception is multimodal, flavor experiences “can strike us as whole, unified percepts,” and “on the basis of that phenomenology, we are often unable to distinguish the sensory components that feed into such experiences.”



FIGURE 3: Flavor experiences are realized by olfactory and gustatory experiences.

Some might contend that flavor experiences really are simple. But there is compelling reason to think that flavor experiences are at least partially realized by gustatory and olfactory experiences. The science of flavor perception indicates that flavor perception involves a combination of olfactory and gustatory perception, and

¹⁶ See Sibley [2006] for even more examples of flavors.

perhaps involve somatosensory and hedonic experiences as well. In particular, differences in gustatory and olfactory perception systematically track differences in flavor experience.¹⁷ Even setting aside the science, it is easy to grasp how flavor experiences are structured with a bit of experimental phenomenology: pinch your nose while eating a food, and you will experience the aspects of flavor experience that are lost when the contribution from olfaction is removed.

Some might object that sometimes we can identify the phenomenal realizers of our flavor experiences. For example, a wine connoisseur can arguably discriminate a rich range of components within their wine experiences. But few subjects can do this with any degree of reliability, and it is plausible that nobody can identify every basic gustatory and olfactory realizer. Even amongst experts, the most careful introspection of one's flavor experience does not put one in a position to know, in precise and complete detail, that experience's gustatory and olfactory realizers. The upshot is the same as in the other cases: STRUCTURE LUMINOSITY is false.

OBJECTIONS

I have argued against STRUCTURE LUMINOSITY, and in doing so I have defended MICROSTRUCTURE.¹⁸ How might an opponent object to my arguments?

A first objection is that the cases above do not exhibit genuine examples of microphenomenal realizers. However, this objection misconstrues the dialectic. The purpose of the cases is to show that STRUCTURE LUMINOSITY is false. By consequence, the principal challenge to MICROSTRUCTURE is unsound. The question of whether the phenomenal realizers discussed above are microphenomenal is

¹⁷ See Auvray & Spence [2008] and Spence & Smith [2013] for overviews of the science of flavor perception, including some discussion of the implications for flavor phenomenology.

¹⁸ These examples also illustrate how non-introspectible phenomenal properties could still contribute to the overall phenomenology of an experience. For example, our pain experiences would be quite different in phenomenal character if they were to lack their affective quality.

independent of that dialectical point. On that question, though, I am inclined to think that the cases I have discussed lie within the borderline region between microphenomenal and macrophenomenal.

A second objection is that subjects do know the realizers of the phenomenal properties they introspect, only under the guise of different concepts. For example, in the case PAIN ASYMBOLIA, one might think that subjects do know that ordinary pain experiences have a sensory and an affective component, even if they do not have concepts that pick out those specific components. However, if this response is tenable, it becomes unclear why STRUCTURE LUMINOSITY is inconsistent with MICROSTRUCTURE in the first place. The microtheorist could argue that subjects do know the microphenomenal realizers of their microphenomenal properties, only under the guise of different concepts.

A third objection is that subjects are in a position to know the realizers of their experiences, even if they cannot actually acquire such knowledge. For example, in the case of PIXEL MOSAIC, one might argue that you are in a position to know which maximally determinate phenomenal property characterizes your visual experience, even if your introspective capacities do not enable you to actually acquire that knowledge. However, in my original formulation of microphenomenal properties, non-introspectibility concerns the actual introspective capacities of normal humans. If STRUCTURE LUMINOSITY abstracts away from those limitations, then one could accept subjects are in a position to know the microphenomenal realizers of their experiences while also holding that their introspective capacities do not enable them to actually acquire such knowledge. As before, this move deflates the force of the challenge by rendering STRUCTURE LUMINOSITY consistent with MICROSTRUCTURE.

A last objection is that these cases do not involve genuine phenomenal realizers. For example, one might argue that in the case of FLAVOR EXPERIENCE, the gustatory and olfactory components are not realizers of flavor experiences, but instead *aspects* of flavor experiences. The difference is a matter of fundamentality; realizers are grounders, whereas aspects are grounded. However, this objection employs a more theoretically demanding notion of 'realizer' than the one that I had

in mind. Remember that MICROSTRUCTURE is consistent with both atomism and holism about experience, meaning that the thesis builds in no claims about the direction of fundamentality. On the relevant understanding of ‘realizer,’ the claim that flavor experiences have gustatory and olfactory phenomenal realizers is consistent with the latter being aspects of the former. Consequently, someone who thinks that experiences have microphenomenal aspects is still committed to a version of MICROSTRUCTURE.

§ 3 | MICROTHEORIES

A *microtheory* is a specific version of MICROSTRUCTURE. This section examines five dimensions along which we can distinguish microtheories. Seeing how MICROSTRUCTURE relates to other issues about experience will also clarify what is built into MICROSTRUCTURE itself.

SCOPE

Which classes of macrophenomenal properties have microphenomenal realizers? According to *global* microtheories, all macrophenomenal properties have microphenomenal realizers. These are the most ambitious versions of MICROSTRUCTURE. But we could also consider *local* microtheories according to which particular categories of macrophenomenal properties have microphenomenal realizers. For example, we could consider whether color experiences or auditory experiences or emotional experiences have microstructures, independently of whether a global thesis is true. And some might think that there are reasons for ascribing microphenomenal structure to some categories of experience but not others. In the middle are *semi-global* microtheories, which take all but a privileged set of macrophenomenal properties to have microphenomenal realizers. For example, some might think that the phenomenal properties characterizing the unity of experience and the subjective character of experience cannot have microphenomenal realizers, even though other kinds of macrophenomenal properties can.

It is plausible that empirical investigation of MICROSTRUCTURE would proceed by way of piecemeal investigation into particular domains of experience. If there is reason to think that a wide range of local domains of experience have microphenomenal structures, then that may pave the way towards a global microtheory. In contrast, this paper has principally been focused on global microtheories since my principal aim is to argue that ascribing microphenomenal structures to experiences is philosophically defensible. In other words, I have focused on broad considerations concerning experience in general, rather than specific considerations concerning local domains of experience.

MIND-BODY PROBLEM

What is the metaphysical nature of experience? Whether one is a physicalist, dualist, idealist, or dual-aspect monist, one could be a microtheorist. For the most part, issues about the metaphysical nature of experience crosscut issues about the structure of experience. Some might wonder whether physicalism entails that experiences have microstructures, since physicalists think that experiences are ultimately realized by microphysical properties. But MICROSTRUCTURE is a thesis about the phenomenal structure of experience, not its structure simpliciter. While a physicalist takes experiences to have more structure than what we can introspect, they might still think that there are only macrophenomenal properties.

What about panpsychism, the view that fundamental physical entities have phenomenal properties?¹⁹ It is common for panpsychists to talk about microphenomenal properties. But neither thesis entails the other. First, one could be a panpsychist macrotheorist. For example, one might hold that the microexperiences of fundamental entities stand in a causal, rather than a constitutive, relation to the macroexperiences of human subjects, and that human experiences have only macrophenomenal structure. Or, one might hold that the

¹⁹ See Strawson [2006], Chalmers [2015, 2016], and Goff [2017] for some recent discussions of panpsychism.

fundamental physical entity is the entire universe, that human experiences are aspects of the universe's cosmic experience, and that human experiences have only macrophenomenal structure. Conversely, one could be an anti-panpsychist microtheorist. For example, one might think that only complex organisms are conscious, but that human experiences have microphenomenal structure.²⁰ The independence of MICROSTRUCTURE and panpsychism is also highlighted by the next subsection concerning subjects.

SUBJECTS

If there are microphenomenal properties, must there be microsubjects? MICROSTRUCTURE is a thesis about the structure of our own experiences, rather than a thesis about the existence of other subjects. Just as positing visual phenomenal properties does not commit us to visual subjects, positing microphenomenal properties does not commit us to microsubjects. Consider how you are currently undergoing a total perceptual experience, which is realized by my visual experience, auditory experience, and so forth. If MICROSTRUCTURE is true, then your experiences also have further microphenomenal realizers. But this does not entail anything about the existence of further subjects.

Some philosophers have argued that phenomenal properties should be understood as properties of subjects, rather than properties of experiences.²¹ Those who favor this framework might find it odd to take microphenomenal properties to be properties of human subjects. But remember that humans have microphysical

²⁰ While MICROSTRUCTURE and panpsychism are independent, MICROSTRUCTURE is entailed by the most popular version of panpsychism: namely, *constitutive micropsychism*. According to this view, the macrophenomenal properties we introspect are realized by microphenomenal properties of microphysical entities. By defending MICROSTRUCTURE, this paper has indirectly defended constitutive micropsychism: if constitutive micropsychism is false, it is not because it is untenable to ascribe microphenomenal structure to experience.

²¹ See Byrne [2009] and Nida-Rümelin [forthcoming] for arguments for this framework. In my view, this framework is best thought of as a version of phenomenal holism, which I discuss below.

properties. For example, the property specifying my exact atomic configuration at this moment is a property of me. Under this framework, microphenomenal properties would characterize extremely fine-grained features of subjects, just as the microphysical properties of humans characterize extremely fine-grained features of humans. None of this means that MICROSTRUCTURE is inconsistent with thinking that there are microsubjects. But the reasons for thinking so would be on grounds independent from MICROSTRUCTURE itself.

Some of the confusion may come from failing to distinguish two different characterizations of microphenomenal properties. Sometimes, the term ‘microphenomenal property’ is used to denote phenomenal properties of microphysical entities.²² In contrast, I take ‘microphenomenal property’ to denote non-introspectible phenomenal properties that realize the macrophenomenal properties we introspect. These characterizations are doubly dissociable, for the reasons mentioned above in the discussion of panpsychism. But I believe that my characterization of microphenomenal properties better parallels how we think about microphysical properties, for the reasons discussed in §1.

FUNDAMENTALITY

There are two questions about fundamentality that are worth examining in conjunction. First, are total experiences grounded in experiential parts? Second, are macrophenomenal properties grounded in microphenomenal properties?

The first issue concerns fundamentality with respect to *mereology of experiences*. According to *atomism*, experiential parts are grounded in total experiences. Under this view, the fundamental phenomenal properties are properties of experiential parts. This would be analogous to the position of an atomist about the physical world that takes the fundamental physical properties

²² This characterization of ‘microphenomenal property’ has been used in some discussions of panpsychism (e.g., Chalmers 2015). I suspect that confusing these two senses of ‘microphenomenal property’ may sometimes obscure the independence between panpsychism and MICROSTRUCTURE, as discussed in the previous subsection.

to be properties of particles. In contrast, according to *holism*, experiential parts are grounded in total experiences. Under this view, the fundamental phenomenal properties are properties of total experiences. This would be analogous to the position of a holist about the physical world that takes the fundamental physical properties to be properties of the entire universe. Both of these views are consistent with taking experiences to have microphenomenal structure, just as atomism and holism about the physical world are both consistent with taking the physical world to have microphysical structure.²³

The second issue concerns fundamentality with respect to *granularity of phenomenal properties*. This issue concerns the granularity of the phenomenal primitives, or the phenomenal properties not grounded in other phenomenal properties. According to *microprimitivism*, the phenomenal primitives are microphenomenal properties. Microprimitivism is probably the default view and is likely what most have in mind when thinking about MICROSTRUCTURE. But MICROSTRUCTURE is also consistent with *macroprimitivism*, the view that the phenomenal primitives are macrophenomenal properties. To get a grip on how macrophenomenal properties could ground microphenomenal properties, think about the relationship between color versus hue, saturation, and brightness. Some think that color phenomenal properties are more fundamental than hue, saturation, and brightness phenomenal properties, and that the latter are abstractions from the former. Similarly, a macroprimitivist microtheorist thinks that macrophenomenal properties ground microphenomenal properties because the latter are abstractions from the former. Consequently, ascribing microphenomenal properties to experience does not entail that the phenomenal primitives are microphenomenal.

These two dimensions of fundamentality are independent. For example, an atomist could be a macroprimitivist. Under this view, the fundamental phenomenal properties are macrophenomenal properties of experiential parts. Conversely, a

²³ For a discussion of holism about the physical world, see Schaffer [2010]. For a discussion of atomism versus holism about experiences, see Lee [2014].

holist could be a microprimitivist. Under this view, the fundamental phenomenal properties are microphenomenal properties of total experiences. Once we recognize those two views are possible, it is easy to see that atomist microprimitivism and holist macroprimitivism are possible positions as well. And any of these views is consistent with MICROSTRUCTURE, for the reasons discussed above. To put it succinctly, MICROSTRUCTURE is a thesis about how much structure experiences have, which leaves open questions about which features of experience are fundamental. By disentangling these issues, we get a more precise understanding of what is built into MICROSTRUCTURE and a more fine-grained taxonomy of different views about the structure of experience.

PALETTE

How big is the base of phenomenal primitives? The most common view is LARGE-PALETTE, according to which there is a large number of phenomenal primitives. LARGE-PALETTE is popular because it is often presumed to be the only game in town. If experiences have only macrophenomenal properties, then it is hard to avoid the conclusion that there is a very large number of phenomenal primitives. After all, it is implausible that all phenomenal properties could be grounded in a privileged set of macrophenomenal properties. McGinn [2006] captures this sentiment when he says that “you cannot get pains from from experiences of colours, or emotions from thoughts, or thoughts from acts of will.” Because of this, the phenomenal primitives are often presumed to be maximally determinate macrophenomenal properties, such as the phenomenal properties characterizing specific color experiences, specific pain experiences, specific olfactory experiences, and so forth. Following this way of identifying the phenomenal primitives, the number of phenomenal primitives quickly multiplies.

However, MICROSTRUCTURE opens up the possibility for SMALL-PALETTE, the view that there is a small number of phenomenal primitives. If SMALL-PALETTE is true, then the rich variety of macrophenomenal properties we introspect are generated by a sparse set of fundamental phenomenal properties. To put it another way, SMALL-PALETTE is the thesis that all experiences are made of the same basic

phenomenal ingredients. Macrophenomenal properties do not stand in the right grounding relations to each other to make SMALL-PALETTE viable, but perhaps they could all be grounded in microphenomenal properties.²⁴

Some might contend that SMALL-PALETTE is dubious even if we accept MICROSTRUCTURE. On the face of it, our experiences are too diverse and variegated to all be made of the same basic phenomenal ingredients. But consider how theorists of antiquity might have been likewise dubious of small-palette theses about the physical world. Such theorists might even have thought that there were principled philosophical reasons for ruling out such a hypothesis: they might have argued that solids can generate only more solids and that liquids can generate only more liquids, or that intangible substances like wind cannot be made from the same things as material substances like earth. In hindsight, it is obvious that these arguments would be unsound. But our current epistemic perspective on the physical world obscures how unobvious this once was. Our inquiry into experience remains in early stages, and our epistemic perspective on experience may be closer to that of theorists of antiquity speculating about the physical world than that of contemporary scientists building upon well-developed scientific foundations. Because of this, I believe we ought to be epistemically humble about the prospects for SMALL-PALETTE if experiences do have microphenomenal structure.²⁵

²⁴ It is even possible to accept MICROSTRUCTURE while holding that there are no phenomenal primitives. For example, one might think that experience is gunky, and that every phenomenal property is grounded in more fundamental phenomenal properties.

²⁵ Of course, there are many views where the physical primitives include physical properties that are not obviously microphysical, such as properties of spacetime. And there are some views where it is not clear whether there are any microphysical primitives, such as views where the fundamental physical properties are properties of the quantum state of the universe. I will set aside these views here. In a more detailed discussion, we could also consider analogous views concerning experience, such as views where the phenomenal primitives include spatial and temporal phenomenal properties.

§ 4 | INVESTIGATING THE MICROPHENOMENAL REALM

Suppose that our experiences do have microstructures. What are our prospects for investigating the microphenomenal realm? This section considers two key questions about this issue. First, what are the methodological challenges in discovering microphenomenal properties? Second, what are our cognitive limitations in forming microphenomenal concepts?

METHODS

The methodological challenges concerning investigation of microphenomenal properties stem from two main sources. First, there are problems that arise from microphenomenal properties being *phenomenal*. Second, there are problems that arise from microphenomenal properties being *microscopic*. I'll discuss each of these briefly, and then problems for the investigation of microphenomenal properties more generally.

The principal challenge for investigating phenomenal properties is that attaining knowledge of phenomenal properties requires first-person (in addition to third-person) methods. Even if we collect all of the relevant third-person data, we still would not gain knowledge of phenomenal properties unless we also integrated the third-person data with first-person data. But collecting reliable first-person data is difficult—it is often unclear both what the best methods are for producing data and how to best interpret the data that is collected.

The principal challenge for investigating microscopic properties is that attaining knowledge of microscopic properties requires tools that transcend our basic observational capacities. When we investigate the microphysical realm, we cannot rely merely on our basic perceptual capacities. To investigate the microstructure of the physical world, we have had to develop experimental methods and technology designed to be sensitive to microphysical properties.

These two problems come together in the case of microphenomenal properties. Since microphenomenal properties are phenomenal, we cannot investigate them without using first-personal methods. But since microphenomenal properties are microscopic, we cannot investigate them using our basic

observational capacities. What we need in order to investigate microphenomenal properties are first-personal methods that transcend our basic introspective capacities.

Could we develop better experimental methods for investigating experience? For example, we might better develop the *method of phenomenal contrast*, where two minimally different experiences are contrasted to isolate a particular phenomenal property.²⁶ Or we might examine more *dissociation cases*, such as pain asymbolia, where two phenomenal properties that we thought were inextricably connected come apart. Or we might conduct *data analyses* on introspective judgments that aim to extract independent dimensions of variation from a set of data. Perhaps these kinds of methods might provide us with indirect knowledge of microphenomenal properties, even if we do not grasp those properties directly through introspection. But all of the above methods are already used for investigating experience, and it's not obvious that better application of those methods would yield knowledge of microphenomenal properties.

Another possibility is to develop novel experimental methods that are substantially better for investigating experience than those we use now. It is likely that developing new breakthroughs in experimental methods would require us to first advance our general understanding of the structure of experience, just as developing better experimental methods for investigating the physical world often depended upon more refined understandings of physical phenomena. If this is right, then developing methods for investigating the microstructure of experience may require us to first get a better understanding of its macrostructure.

What about our prospects for developing technology to enhance investigation of experience? The development of technology that enhances our investigation of the physical world has played a crucial role in our understanding of the microphysical realm. Perhaps to thoroughly investigate the microstructure of experience, we need to develop *first-person technology* that enhances first-person investigation of experiences. For example, perhaps subjects might acquire better

²⁶ See Siegel [2011] for a discussion and defense of the method of phenomenal contrast.

introspective capacities with advanced training, or specially designed drugs, or artificial alterations to their cognitive architectures. If first-person technology could be developed, we might be able to investigate the structure of experience.

The prospect of developing first-person technology raises a number of issues. There are epistemological issues, such as how we would know that we are altering a subject's introspective capacities rather than the phenomenal character of the subject's experience or the subject's dispositions to make reports about their own experiences. To gain traction on that issue, we need to better understand the nature and mechanisms of introspection. And there are communicational issues, such as how first-personal data about microphenomenal properties might be stored in a format accessible to subjects besides the one undergoing the experience. To gain traction on that issue, we need to develop reliable ways of translating first-personal data into formats that are third-personally accessible.

Nevertheless, I believe there are good prospects for developing first-person technology. In other work, I argue that it is possible to develop technology for the scientific investigation of experience. In particular, I believe that technology could enhance our ability to control the parameter's a subject's experiences and enhance a subject's introspective capacities.²⁷ This still leaves open whether such technology would enable us to empirically confirm or disconfirm MICROSTRUCTURE. But while the methodological issues are challenging, I am cautiously optimistic.

CONCEPTS

In addition to the issues concerning the discovery of microphenomenal properties, there are also issues concerning our ability to form concepts for microphenomenal properties.

It is useful to distinguish between two kinds of phenomenal concepts.²⁸ *Pure phenomenal concepts* are concepts that pick out phenomenal properties directly via their phenomenal character. When I think about what it is like to have a

²⁷ Blinded for review.

²⁸ See Chalmers [2003] for a more extended discussion of phenomenal concepts.

phenomenal red experience, for example, I am employing a pure phenomenal concept. *Impure phenomenal concepts* are concepts that pick out phenomenal properties via definite description or linguistic deference. When I think about the fact that phenomenal redness is the property typically instantiated in humans when they see red objects, I am employing an impure phenomenal concept. Before Mary leaves her black and white room,²⁹ she has rich impure phenomenal concepts of phenomenal redness but no pure phenomenal concept of phenomenal redness.

What are the prospects for acquiring *pure microphenomenal concepts*? It's plausible that acquiring a pure phenomenal concept of a phenomenal property requires being able to introspect that property.³⁰ A congenitally blind person cannot acquire a pure phenomenal concept of phenomenal redness since they do not have visual experiences that they can introspect. I cannot acquire a pure phenomenal concept of the proprioceptive experiences of an octopus since I do not have octopus experiences that I can introspect. And it is hard to see how normal humans could acquire pure microphenomenal concepts at all given that normal humans cannot introspect microphenomenal properties.

Consequently, our prospects for acquiring pure microphenomenal concepts may depend upon our prospects for enhancing our introspective capacities.³¹ The problem is that it is unclear whether it is at all possible to enhance introspection.

²⁹ This is in reference to Jackson [1982].

³⁰ Perhaps another way of forming a pure phenomenal concept of a phenomenal property is to extrapolate from other pure phenomenal concepts of similar phenomenal properties. Even if I have never had an experience as of a specific shade of blue (and so have never introspectively discerned that phenomenal property), perhaps I can still form a pure phenomenal concept of that phenomenal property by extrapolating from the phenomenal blue experiences I have had. But even if this is right, it is implausible that one can extrapolate from pure macrophenomenal concepts to pure microphenomenal concepts.

³¹ It is worth remembering, though, that we already have reasons independent of MICROSTRUCTURE to think that there are plenty of pure phenomenal concepts that are out of reach for us. For example, normal humans cannot acquire pure phenomenal concepts for certain bat experiences, octopus experiences, and other exotic experiences.

This is in part because there is no sense organ for introspection. In the case of perception, we can get a grip on how to enhance our perceptual capacities by examining the functional properties of our sense organs. But in the case of introspection, there is no obvious way of identifying its mechanisms. Even aside from that point the mechanisms of introspection are not well understood. As it stands, it is an open question whether it would be possible to enhance our introspective capacities.³²

What about *impure microphenomenal concepts*? Even if Mary cannot acquire a pure concept of phenomenal redness, she can still acquire rich impure concepts of phenomenal redness. Similarly, even if many pure microphenomenal concepts are out of reach, perhaps we could still acquire impure microphenomenal concepts. However, these cases might be disanalogous. Mary's impure concept of phenomenal redness is substantive because she has substantive theoretical knowledge about phenomenal redness. But our epistemic position with respect to microphenomenal properties is quite different from Mary's epistemic position with respect to phenomenal colors. Mary does not know the phenomenal character of phenomenal redness, but she knows many other facts about phenomenal redness. In contrast, we lack both knowledge of the phenomenal character and theoretical knowledge of microphenomenal properties. For example, we do not know what theoretical roles particular microphenomenal properties play, beyond that of grounding macrophenomenal properties.

If we could attain more theoretical knowledge about microphenomenal properties, then we might be able to acquire more substantive impure microphenomenal concepts. But that requires us to address the major methodological challenges discussed previously. The methodological issues and the conceptual issues intertwine—how substantive our concepts of microphenomenal properties could be may depend upon the extent to which we can surmount the methodological challenges.

³² For more discussion of introspection and its mechanisms, see Schwitzgebel [2014].

The upshot is that investigating the microphenomenal realm requires addressing these methodological and conceptual challenges. But while they may be formidable, it is worth remembering that we are at early stages for investigating the structure of experience. Our epistemic position with respect to the structure of experience is like the epistemic position of theorists of antiquity with respect to the structure of the physical world. Perhaps just as theorists of antiquity were not in a position to appreciate the tools and methods we have developed for investigating the physical world, we are not in a position to appreciate the tools and methods that could be developed for investigating experience. Perhaps in the future ingenious new ways of investigating experience will be devised, and we shall explore the depths of the microphenomenal realm.

REFERENCES

- Auvray, M. & Spence, C. (2008). The multisensory perception of flavor. *Consciousness and Cognition* 17 (3):1016-1031.
- Block, Ned (1995). On a confusion about a function of consciousness. *Brain and Behavioral Sciences* 18 (2):227--247.
- Block, Ned (2011). Perceptual consciousness overflows cognitive access. *Trends in Cognitive Sciences* 15 (12):567-575.
- Byrne, Alex (2003). Color and similarity. *Philosophy and Phenomenological Research* 66 (3):641-65.
- Byrne, Alex (2009). Experience and content. *Philosophical Quarterly* 59 (236):429-451.
- Chalmers, David J. (2003). The content and epistemology of phenomenal belief. In Quentin Smith & Aleksandar Jokic (eds.), *Consciousness: New Philosophical Perspectives*. Oxford University Press 220--72.
- Chalmers, David J. (2015). "Panpsychism and Panprotopsychism", in Alter & Nagasawa 2015: 246-276
- Chalmers, David (2016). "The Combination Problem for Panpsychism", in Brüntrup & Jaskolla 2016: 179-214. doi:10.1093/acprof:oso/9780199359943.003.0008
- Dainton, Barry F. (2000). *Stream of Consciousness: Unity and Continuity in Conscious Experience*. Routledge.
- Damnjanovic, Nic (2012). Revelation and Physicalism. *Dialectica* 66 (1):69-91.
- Dennett, D.C. Synthese (1978). Why you can't make a computer that feels pain 38: 415.

- Goff, Philip (2015). 'Real acquaintance and physicalism,' in P. Coates & S. Coleman (Eds.) *Phenomenal Qualities: Sense, Perception, and Consciousness*, Coates, P. and Coleman, S. (Eds.), Oxford University Press.
- Goff, Philip (2017). *Consciousness and Fundamental Reality*, New York: Oxford University Press.
- Grahek, Nikola (2007). *Feeling Pain and Being in Pain* (2nd Edition), MIT Press.
- Hardcastle, Valerie Gray (1997). What a Pain is Not, *The Journal of Philosophy*, vol. 94.
- Hardin, C.L. (1988/1993). *Color for Philosophers: Unweaving the Rainbow*. Second edition (1993). Indianapolis: Hackett Publishing Company.
- Hurvich, L.M. (1981). *Color Vision*. Sunderland: Sinauer Associates Inc
- Jackson, Frank (1982). Epiphenomenal qualia. *Philosophical Quarterly* 32 (April):127-136.
- Klein, Colin (2015). What Pain Asymbolia Really Shows. *Mind* 124 (494):493-516.
- Kupers RC, Konings H, Adriaensen H, Gybels JM. Morphine differentially affects the sensory and affective pain ratings in neurogenic and idiopathic forms of pain. *Pain*. 1991 Oct;47(1):5-12.
- Lee, Geoffrey (2015). Experiences and their Parts. In Bennett Hill (ed.), *Sensory Integration and the Unity of Consciousness*. MIT Press.
- Lockwood, Michael (1993). The grain problem. In Howard M. Robinson (ed.), *Objections to Physicalism*. Oxford University Press.
- Marks, L. E. (1987). On cross-modal similarity: Auditory–visual interactions in speeded discrimination. *Journal of Experimental Psychology: Human Perception and Performance*, 13, 384–394.

- Maxwell, Grover (1978). Unity of consciousness and mind-brain identity. In John C. Eccles (ed.), *Mind and Brain*. Paragon House.
- McGinn, Colin (2006). Hard questions - comments on Galen Strawson. *Journal of Consciousness Studies* 13 (10-11):90-99.
- Nida-Rümelin, Martine (forthcoming). The experience property frame work: a misleading paradigm. *Synthese*:1-27.
- Parise, Cesare V. (2016). Crossmodal Correspondences: Standing Issues and Experimental Guidelines. *Multisensory Research*, 29, 7-28 (2016), DOI: <https://doi.org/10.1163/22134808-00002502>
- Ploner M, Freund H K, Schnitzler A. Pain Affect Without Pain Sensation in a Patient with a Postcentral Lesion, *Pain*, 1999, vol. 81.
- Price, Donald (2000). Psychological and Neural Mechanisms of the Affective Dimension of Pain, *Science*, 2000, vol. 288.
- Roelofs, Luke (2014). Phenomenal Blending and the Palette Problem. *Thought: A Journal of Philosophy* 3 (1):59-70.
- Rosenthal, David M. (2005). Sensory qualities, consciousness, and perception. In *Consciousness and Mind*. Clarendon Press. 175-226.
- Rosenthal, David M. (2005). "Quality Spaces and Sensory Modalities", in *The Nature of Phenomenal Qualities: Sense, Perception, and Consciousness*, ed. Paul Coates and Sam Coleman, Oxford: Oxford University Press, 2015,
- Russell, Bertrand (1912). *The Problems of Philosophy*. Barnes & Noble Books.
- Schaffer, Jonathan (2010). Monism: The Priority of the Whole. *Philosophical Review* 119 (1):31-76.

Schwitzgebel, Eric (2008). The Unreliability of Naive Introspection. *Philosophical Review* 117 (2):245-273.

Schwitzgebel, Eric, "Introspection", *The Stanford Encyclopedia of Philosophy* (Summer 2014 Edition), Edward N. Zalta (ed.), URL = <http://plato.stanford.edu/archives/sum2014/entries/introspection/>.

Sibley, Frank (2006). *Approaches to Aesthetics: Collected Papers on Philosophical Aesthetics*, edited by J. Benson, B. Redfern, J. Roxbee cox, Oxford University Press.

Smith, Barry (2013). The Nature of Sensory Experience: The Case of Taste and Tasting. *Phenomenology and Mind Online Journal* 2013, pp. 292-313 ISSN 2280-7853 (print), ISSN 2239-4028.

Spence, C. (2011) Attention, Perception, & Psychophysics. 73: 971. <https://doi.org/10.3758/s13414-010-0073-7>

Spence, C. Auvray, M. and Smith, B. (2013), 'Confusing Tastes and Flavours' in *New Essays in Multisensory Perception*, edited by D.Stokes, M.Fullford and M.Matthen, Oxford University Press, forthcoming.

Stoljar, Daniel (2013). Four Kinds of Russellian Monism. In Uriah Kriegel (ed.), *Current Controversies in Philosophy of Mind*. Routledge. pp. 17.

Strawson, Galen (2006). Realistic monism - why physicalism entails panpsychism. *Journal of Consciousness Studies* 13 (10-11):3-31.

Williamson, Timothy (2000). *Knowledge and its Limits*. Oxford University Press.