

Are sensations still brain processes?

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Fifty years ago J. J. C. Smart published his pioneering paper, “Sensations and Brain Processes.” It is appropriate to mark the golden anniversary of Smart’s publication by considering how well his article has stood up, and how well the identity theory itself has fared. In this paper I first revisit Smart’s (1959) text, reflecting on how it has weathered the years. Then I consider the status of the identity theory in current philosophical thinking, taking into account the objections and replies that Smart discussed as well as some that he did not anticipate. Finally, I offer a brief manifesto for the identity theory, providing a small list of the claims that I believe the contemporary identity theorist should accept. As it turns out, these are more or less the ones that Smart defended fifty years ago.

Keywords: Identity Theory; J. J. C. Smart; Physicalism

1. Sensations and Brain Processes

Fifty years ago J. J. C. Smart published his pioneering paper, “Sensations and Brain Processes” (1959), in which he defended the mind–brain type identity theory. Smart did not invent the identity theory.¹ Smart’s accomplishment, rather, was to motivate and defend a robustly realist and physicalist ontology of the mind in the heyday of behaviorist psychology and ordinary language philosophy. In doing so Smart formulated some of the arguments and vocabulary, and invented some of the philosophical tools, that still dominate discussion of the view.

It is appropriate to mark the golden anniversary of Smart’s publication by considering how well his article has stood up, and how well the identity theory itself has fared. In the next two sections I revisit the most important parts of Smart’s text, reflecting on how it has weathered the years. I will need to remark on some of the context and presuppositions of Smart’s work in order to explain its significance; however, my aim is to perform an assessment from our current point of view, rather than to produce a comprehensive scholarly record of responses to Smart (concerning

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the history, see Place, 1988; Smart, 2007). In section 4, I consider the status of the identity theory in current philosophical thinking, taking into account the objections and replies that Smart discussed as well as some that he did not anticipate. I argue that all of the arguments have a common form, and explain how recognizing this form is useful for defenders of the identity theory. Finally, in section 5, I offer a brief manifesto for the identity theory, providing a small list of the claims that I believe contemporary identity theorists should accept. As it turns out, these are more or less the ones that Smart defended in 1959. However, there are also some that current defenders should endorse although Smart himself would not.

2. Behaviorism and the Case for the Identity Theory

It is convenient to divide “Sensations and Brain Processes” into three parts. The second part is the core of the paper, wherein Smart states and responds to eight objections. We will return to it in the next section. This core is bookended by an articulation of the thesis and some explanations of the reasoning that favors the theory.

Let us begin with the bookends. In the opening and closing portions of the paper, Smart advances six theses:

- (1) Sensation reports are genuine reports.
- (2) Sensation reports do not refer to anything irreducibly psychical.
- (3) Sensations are “nothing over and above” brain processes.
- (4) Sensations are identical to brain processes.
- (5) The identity theory is a metaphysical theory, not a semantic proposal or an empirical hypothesis.
- (6) Metaphysical theories of the nature of the mind do not make competing empirical predictions; so they should be evaluated by their theoretical virtues, e.g., simplicity and parsimony.

Thesis (1) is simply an avowal of *realism* about sensations as internal states. Theses (2) and (3) amount to a commitment to *physicalism* and *minimal reductionism* about the mind. Smart does not have much to say about these three claims. Regarding (2), he reports that he finds the dualist theory to be entirely unconvincing: “It seems to me that science is increasingly giving us a viewpoint whereby organisms are able to be seen as physico-chemical mechanisms” (1959, p. 142).² And, following Feigl (1958), Smart thinks that dualistic sensations would be ontologically “queer” and nomological epiphenomenal “danglers” (p. 143). So he more or less takes it for granted that when we report that we experience a sensation, e.g., an afterimage, we are not compelled to think that we are reporting the occurrence of anything “irreducibly psychical.” As to (3), Smart seems to think that any genuine physicalist alternative to dualism will be *minimally reductionist* insofar as it holds that the sensations are “nothing over and above” the physical.

For these reasons, Smart says, he is attracted to the quasi-behaviorist views of Wittgenstein and Ryle, according to which apparent “reports” of sensations are not reports of anything irreducibly psychical because they are not reports at all.

Rather, so-called sensation reports are really just “a sophisticated sort of wince” (p. 141) by which one responds to some range of bodily stimuli. This view has the merit of avoiding the conclusion that sensations are nonphysical entities, or that sensation reports are reports of nonphysical events. But it achieves this at the cost of denying that sensation reports are genuine reports at all, or that descriptions of sensations are descriptions of anything at all. This seems wrong to Smart. Though he is inclined to the Rylean view of intentional states like belief, he is a *realist* about sensations; he thinks that a person who reports seeing an afterimage is genuinely reporting something. And he is a *physicalist*; for if that something is not nonphysical, he reasons, then it may well be a physical something. Thus his proposal: “why should not sensations just be brain processes of a certain sort?” (p. 144).

Smart’s specific proposal of the identity theory, (4), is that sensations should be “strictly” identified with brain processes. In saying that the identity is “strict” he means to distinguish his claim from other things that might be said using the locution, “sensations are brain processes,” such as: (a) that sensations are made of brain processes, i.e., have brain processes as mereological parts; (b) that sensations are spatially and temporally collocated with brain processes, i.e., are “constituted” by them as Lynne Baker might say; or (c) that sensations are spatially and/or temporally continuous with brain processes, i.e., that sensations and brain processes are time slices of a four-dimensional object. These alternatives are not the identity theory; Smart’s “is” is the “is of identity.” But he is quick to point out that he does not require that talk of sensations be *synonymous* with talk of brain processes. This is part of (5), the insistence that the identity theory is a metaphysical thesis:

The thesis does not claim that sensation statements can be *translated* into statements about brain processes. Nor does it claim that the logic of a sensation statement is the same as that of a brain-process statement. All it claims is that in so far as a sensation statement is a report of something, that something is in fact a brain process. Sensations are nothing over and above brain processes. (p. 145)

Though the strict identification of sensations with brain processes remains a minority view, the insistence that sensations are (in some sense) nothing over and above brain processes is now commonplace, as a basic component of any generic physicalism about the mind. So too the observation that sensations may be nothing over and above brain processes without entailing that the meanings or “logic” of sensation and brain-processes statements are the same.³ Thus it is fair to say that Smart helped to lay the groundwork for any physicalist theories of the nature of mental states, even those that reject his specific proposal that sensations and brain processes are related by strict identity. As Jaegwon Kim (1998) notes:

The brain state theory helped set the basic parameters and constraints for the debates that were to come . . . when the brain state theory began fading away in the late 1960s and early 1970s few lapsed back into Cartesianism or other serious forms of mind–body dualism. (p. 2)

The main considerations that Smart gives in favor of the identity view specifically, or in favor of physicalism generally, are Occamist. In the closing pages of the article,

Smart returns to the question of what can be said positively in favor of the identity theory. Here the purpose is to contrast his own reasoning with that of fellow identity theorist U. T. Place (1956). Place argued for the identity theory by inference to the best explanation. According to him, the mind–brain identity theory is an empirical hypothesis to be defended by broadly empirical and inductive argument.

Smart counters that if the competing hypothesis is that sensations are kidney processes, then the identity theory may be treated as an empirical hypothesis. But if the competing hypothesis is dualism (“epiphenomenalism”), then the two accounts make no distinguishing predictions. In that case, the accounts compare not as empirical peers but as the evolutionary account of fossil evidence compares with a creationist account. These are not competing empirical theories, for they make no distinctive claims about the data. But one theory can nevertheless be preferred over the other, and the grounds for preferences are those of simplicity. This is (6). Smart reminds us of his previously stated reservations about dualism, and concludes that:

If it be agreed that there are no cogent philosophical arguments which force us into accepting dualism, and if the brain processes theory and dualism are equally consistent with the facts, then the principles of parsimony and simplicity seem to me to decide overwhelmingly in favor of the brain-process theory. (p. 156)⁴

Today many philosophers agree with Smart that metaphysical theories about the nature of minds do not compete as scientific theories do, as empirical hypotheses. Simplicity arguments have, indeed, been a mainstay of the philosophy of mind. By making these claims, however, Smart is rejecting verificationism and the anti-metaphysical sentiments that dominated the positivist and post-positivist period. Smart asserts that the identity theory is a perfectly coherent metaphysical theory. He further asserts that such metaphysical theories can be evaluated on their theoretical merits.⁵ This reinforces his commitment to (5), the significance of shamelessly ontological claims.

For the moment, the important observation is that of Smart’s six theses, at least four have become widely accepted in the philosophy of mind: (1) realism, (2) physicalism, (5) unapologetic ontological theorizing, and (6) preference for simplicity as a theoretical merit—famously described by Quine (1948) as a “taste for desert landscapes.”⁶ When these four theses are combined with (3) minimal reductionism, we get a familiarly “Australian” approach to metaphysics generally and the metaphysics of mind in particular, subsequently developed by David Armstrong (1968) and “honorary Australian” David Lewis (1966, 1969, 1970, 1972, 1980, 1994).⁷

3. Objections to the Identity Theory and Smart’s Replies

Smart considers eight objections to the identity theory. In most cases Smart’s replies amount to distinguishing the ontological claim of the identity theory from similar semantic or epistemic claims that are not part of the ontological theory. These replies

strike many contemporary readers as common sense. But we also come to them with different background assumptions than Smart's own. In particular, we must remember that Smart was formulating his responses largely within the constraints of logical empiricism, and without the benefit of the metaphysical and semantic insights associated with the work of Saul Kripke (1971, 1972/1980). Most saliently, Smart does not question the traditional linkage between analyticity, necessity, and a priority. This means that Smart cannot give today's common sense replies to the objections.

For example, the first objection says that someone can know things about their sensations, yet "know nothing whatever about neurophysiology" (p. 146). The implication is that if the identity theory were true then someone who knew something about sensations would *ipso facto* know something about brain processes. But ordinary speakers do not seem to know anything at all about their brain processes, even that they have them; so the identity theory is false. Smart chides that "you might as well say that a nation of slug-abeds, who never saw the morning star or knew of its existence . . . could not use this expression ["the Morning Star"] to refer to the same entity as we refer to" with that expression (p. 146). But his detailed response is to assimilate the case to a standard Fregean puzzle about the informativeness of identity statements, and then to point out that two expressions with different senses can have the same reference: "there can be contingent statements of the form 'A is identical to B,' and a person may well know that something is an A without knowing that it is a B" (p. 147). As we would say these days, belief and knowledge attributions are opaque contexts, that is, contexts in which one cannot substitute coreferring expressions *salva veritate*.

But note that Smart assumes that an identity statement that is not known a priori must be contingent. For he assumes that if it were necessary then it would be known a priori. This assumption is part of the traditional view of a priority and necessity that is rejected by most post-Kripke identity theorists. From our current point of view, it is easy to explain why the first objection fails: it assumes that the ontological claim has epistemological or semantic consequences. Once we distinguish the ontological identity claim from any claims about synonymy or a priority, then there is no concern. Following Kripke (1971, 1972/1980) we can hold that the fact that identity statements are synthetic and a posteriori does not show that they are contingent.

The third and most famous objection, known as *Black's objection*, fits the same pattern, though Smart reports that he had least confidence in his response to this objection (p. 148). The general idea behind Black's objection is that even if we can identify mental processes with brain processes, it does not follow that we can identify mental properties with brain properties:

For suppose we identify the Morning Star with the Evening Star. Then there must be some properties which logically imply that of being the Morning Star, and quite distinct properties that entail that of being the Evening Star. Again, there must be some properties (for example, that of being a yellow flash) which are logically distinct from those in the physicalist theory. (p. 148)

If so, Smart's identity theory is still a kind of dualism—not substance dualism, but property dualism. The argument for the paradoxical conclusion of Black's objection, which Smart offers on behalf of the objector, depends on a particular view about how words or concepts connect to their referents: For any expression there are conditions such that if those conditions obtain then it is "logically" necessitated that the expression applies. This view was current at the time, and is having something of a resurgence of popularity today. As Place (1960) puts it, "there are certain logical conditions which must be satisfied to enable us to say that a process or event observed in one way is the same process or event observed in (or inferred from) another set of observations" (p. 101). Let us think of this as a seventh thesis to which Smart is committed:

- (7) For any thing or kind x , there are "logically" necessary conditions for being a thing of that kind.

If (7) is correct, then the procedure for justifying a mind–brain identity claim is to show that some brain processes satisfy the "logical" conditions for being a mental process, such as a sensation.⁸ From this point, the objector reasons as follows: If the "logical" conditions for being a mental states involved only physical properties, then it would be a priori and necessary that sensations are brain processes. But the identity theory does not seem to be a priori or necessary. From this it follows that the conditions, i.e., properties, definitive of mental states are "logically distinct from those in physicalist theory" (p. 148). Since these properties are "logically distinct" from physical properties and definitive of mental events or processes, it is not unreasonable to think of them as irreducibly mental ("psychical") themselves. Thus, we have a case of property dualism.

Contemporary readers will associate Black's objection with the logical empiricist tradition, and with descriptivist theories of meaning and reference. Many will find it reasonable to reject the idea that for every expression there are "logically" sufficient conditions for its application. And even more so to reject Place's (1960) claim that these conditions must be settled prior to taking up empirical questions, and that evaluating those criteria is "a philosophical issue" (p. 102).⁹ So many contemporary philosophers will find no teeth at all in Black's objection.

But it was not Smart's tactic to reject the "logical" constructivist picture and its demands. Indeed, Smart agrees that the conditions associated with mental processes are distinct from those associated with physical processes. But he argues that those conditions can be distinct without being irreducibly psychical. Rather, he proposes, the "logical" conditions for being a sensation are "quasi-logical or topic-neutral" (p. 150). He writes:

Now how do I get over the objection that a sensation can be identified with a brain process only if it has some phenomenal property, not possessed by brain processes, whereby one-half of the identification may be, so to speak, pinned down? My suggestion is as follows. When a person says, "I see a yellowish-orange after-image," he is saying something like this: "*There is something going on which is like what is going on when I have my eyes open, am awake, and there is an orange*

illuminated in good light in front of me, that is, when I really see an orange.”
(p. 149, original italics)

According to Smart, “there is something going on which is like . . .” is neutral as to what kind of event is going on, just as “someone telephoned” is neutral as to whether it was a man or a woman who telephoned, or a doctor or a teacher who telephoned. “Someone telephoned” may be a statement about the doctor (for it was the doctor who telephoned) without being a “medical” statement or having the “logic” of a medical statement (p. 151; see also Smart, 1961, p. 406). This is important enough to count as the eighth thesis asserted by Smart:

(8) Sensation expressions are topic-neutral.

The doctrine that sensation talk is topic-neutral, that it is not ontologically physicalist or dualist, allows Smart to answer Black’s objection. It also opens the door to some subtle objections that Smart did not foresee, to which we shall return in the next section.

Sometimes it is said that Smart introduced the idea of topic-neutral “translations,” as though sensation talk itself is not topic neutral but can be given a topic-neutral gloss. But Smart is explicit that he means to claim that sensation talk is, itself, topic neutral (1959, p. 150; 1961, p. 407).¹⁰ This is important for several reasons. First, there are later traditions in philosophy of mind that try to translate, “analyze,” or “reduce” expressions about mentalistic processes into topic-neutral expressions about “functional” processes, and those views are distinct from Smart’s. Second, the topic-neutral “translation” reading of Smart, if taken seriously, saddles him with a commitment to a claim about the meanings of mentalistic expressions, rather than just a claim about their referents. Yet Smart repeatedly insists that he is not making a claim about meanings, and there is reason to take his self-interpretation at face value. Finally, it is important that sensation statements are themselves topic neutral rather than just having topic-neutral “translations” because Smart needs to claim that sensation talk does not involve or commit itself to any irreducibly psychical properties, not merely that sensations can be referred to without mentioning such properties. Consider the case in which there are, in fact, immaterial mental properties, such as orange qualia. I might still be able to refer to them using topic-neutral vocabulary, for example, by saying, “a property like the property typically instantiated when I see an orange. . . .” But the availability of such an extensional “translation” does not show that there are no irreducibly psychical properties. What is needed, rather, is the claim that sensation talk is already topic neutral. *That* observation is what undercuts the presumption that mentalistic language is dualistic in its ontological commitments in the first place, and that is what Smart claims. According to my reading, Smart’s associated gloss, “there is something going on which is like what is going on when . . .” merely serves to explain the idea that sensation talk is topic-neutral, not to translate sensation talk.¹¹

Most of the objections that Smart considers involve mistaking the ontological thesis of the identity theory with an apparently related epistemic or semantic claim, or they involve arguing that the ontological thesis has unacceptable epistemic or

semantic consequences. Smart's responses are adequate, but to some extent they come off as foot-stomping. After all, it is notoriously problematic to say what is or is not part of the "logic" of sensation expressions (or any expressions), in the open-ended sense appealed to in this sort of dispute.¹² But our current perspective is quite different. The important intervening event, mentioned several times above, was the appearance of Saul Kripke's *Naming and Necessity* and related work (Kripke, 1971, 1972/1980). Kripke argues that we can separate necessity, a prioricity, and analyticity (and their complements). Breaking these links allows for a more decisive response to Smart's imagined objectors, and alleviates the need for some of the apparatus that Smart uses. Rather than making any claims about the "logic" of sensation statements, we can state flatly that the identity theory is an ontological thesis: semantics and epistemology are different matters, so let those chips fall where they may.

Most importantly, Kripke argued that strict identity is always necessary. If sensations and brain processes are identical, then they are necessarily identical. Smart and the other early identity theorists all insisted that the mind–brain identity was contingent. The reason for this is plain: they all believed that if the relation were necessary then it would be analytic and knowable a priori; but the mind–brain identity is not analytic or a priori; therefore the mind–brain identity (if true) must be contingent. Kripke made it possible to see that this line of reasoning is invalid, that an identity claim could be both necessary and a posteriori. If the mind–brain relation is a genuine identity, then it is necessary. If it is not necessary, then it is not identity. As Lycan (1987) puts it, "the upshot of all this is that the would-be Identity Theorist has (and must make) a few choices that no one noticed prior to 1971" (p. 21). The "would-be" identity theorist, that is, must decide whether to be an identity theorist or a functionalist ("relationalist," Lycan says). And it seems clear that Smart would take the first option, asserting that sensations are genuinely ("strictly") identical to brain processes, and accepting both Kripke's case that the identities are necessary as well as the new Kripkean resources for responding to the semantic and epistemic objections. That is, he would stand by (4), rather than any semantic or epistemic theory that implies the denial of (4). In particular, Smart can maintain (4) and give up (7)—the idea that there must be "logical" conditions for being a thing of a certain sort—and thereby finally sever the alleged connection between ontology and semantics or epistemology.

4. New Objections and Replies

Smart's replies effectively showed that there are no simple epistemic or semantic reasons to dismiss identity theories, or physicalist theories in general. Nevertheless, within a decade the identity theory was widely regarded as a dead end.

The primary reason philosophers gave up the identity theory was that they were convinced by Hilary Putnam's (1967) argument that mental states or processes are multiply realized or multiply realizable, and that multiple realization is

incompatible with the identity theory. This kind of concern was foreshadowed by the seventh objection that Smart examined, in which he considered our apparent abilities to imagine that we are brainless rocks. But Putnam gave it its distinctive form as an objection to the identity theory. Already on its heels from the multiple realization attack, the identity theory took a second blow from Kripke's argument against materialism.¹³ So by the early 1970s, even physicalist philosophers almost universally preferred some other version of physicalism over the identity theory. This was the status quo until some philosophers began to reconsider the identity theory in the 1980s and 1990s. Current identity theorists believe that they can defuse familiar versions of the Putnamian and Kripkean objections. However a new kind of objection has recently come into play, one that begins with the identity theorists' response to Kripke and develops into a new version of Black's objection.

It is not often appreciated that all of the objections to the identity theory share a common form. They all challenge the identity theorists' claim that there is a one-to-one relation between sensations and brain processes. In that sense they are all "multiple realization" arguments. They each appeal to different sorts of multiplicity and therefore require distinct responses from the identity theorist. But they share a common argument schema, which I will put in terms of a to-be-explained thesis called *Variation*:

- P1. If the identity theory is true, then there is a necessary one-to-one relation between sensations and brain processes.¹⁴ (necessity of identity)
- P2. If *Variation* then there is not a necessary one-to-one relation between sensations and brain processes. (definition of *Variation*)
- P3. *Variation*.
- P4. There is not a necessary one-to-one relation between sensations and brain processes. (P2, P3)
- P5. The identity theory is false. (P1, P4)

The argument schema appears to be valid. (P1) is not doubted by contemporary identity theorists. Thus it is (P2) and (P3) that critics must defend, and to which the identity theorist will want to object.

Much depends on how *Variation* is formulated, and what reasons are given in support of it. There are four important versions of *Variation*:

- Actual Variation*. There are actual cases in which sensations and brain processes are not in a one-to-one relation.
- Nomological Variation*. There are nomologically possible cases in which sensations and brain processes are not in a one-to-one relation.
- Metaphysical Variation*. There are metaphysically possible cases in which sensations and brain processes are not in a one-to-one relation.
- Logical Variation*. There are logically possible cases in which sensations and brain processes are not in a one-to-one relation.

Actual Variation and *Nomological Variation* capture the claims that figure in the multiple realization and multiple realizability arguments of Hilary Putnam and Jerry Fodor. *Metaphysical Variation* figures in Saul Kripke's modal argument. And *Logical Variation* figures in the newest objection to identity theories, most forcefully

deployed by David Chalmers and Frank Jackson. I will discuss each objection in turn, with emphasis on the most recent.

According to Putnam's original argument, we have empirical evidence for *Actual Variation*, or multiple realization. He writes that the identity theorist must be prepared to identify the sensation of pain with a brain process that can occur not only in mammals but also other creatures: "This means that the physical-chemical state in question must be a possible state of a mammalian brain, a reptilian brain, a mollusc's brain (octopuses are mollusca, and certainly feel pain), etc" (Putnam, 1967, p. 436, 1975). It is a bit obscure just what Putnam thought was the evidence for multiple realization, as both parts of the claim seem weakly supported. First we need evidence that mammals, reptiles, and mollusks experience pain, and indeed that they experience the same kind of pain sensations as humans and thus as one another. If they cannot all have at least some sensations of exactly the same kinds, then there is no question of them multiply realizing any one kind of sensation.¹⁵ Let's suppose, following Putnam for the sake of argument only, that we have reason to think that mammals, reptiles, and mollusks can all experience pain sensations of the same kinds as humans. Second, we need evidence that the brain processes that realize pain in each kind of creature are of neurobiologically distinct kinds. What reason do we have to support this contention? One might think that the gross phenotypic distinctness of the members of the three classes gives us some evidence of their neurological distinctness. But this is a very weak argument at best. (Compare the argument: mammals, reptiles, and mollusks are obviously different, so they cannot have neurons of the same kind, or cannot have eyes of the same kind, or cannot have hearts.) Other advocates of multiple realization have argued that it is evidenced by the phenomena of neural plasticity. This kind of evidence has a better claim to support the conclusion, but even then it must be conceded that the actual evidence remains quite inconclusive (for detailed discussion of this issue, see Shapiro, 2004a, and my 2009a, 2009b). Moreover, the kind of variation that would be evidenced by neural plasticity falls far short of what would be needed to be a problem for reasonable versions of the identity theory. In particular, evidence from plasticity is compatible with the neurobiological variations being variants within a more general kind that is also neurobiological (see Bechtel & McCauley, 1999; Bechtel & Mundale, 1999; Shapiro, 2004a, 2008). If so, *Actual Variation* is compatible with there being a necessary one-to-one relation between sensations and some brain processes, even if it rules out a one-to-one relation to others. So the arguments against the identity theory that are based on *Actual Variation* are not very convincing. The versions that are likely to make (P3) true are not strong enough to secure (P2). And there is no actual evidence for the kinds of variation that make (P2) true; so on those readings (P3) is false.

Rather than citing actual cases of multiple realization, the critic of identity theory might appeal instead to the possibility of variation, such as *Nomological Variation*. On this view, whether or not there is any actual evidence of sensations and brain processes failing to be in a one-to-one relation, nevertheless it is not nomologically guaranteed that they are in such correspondence. Therefore it is possible for there to

be variation. Sensations might not be multiply *realized*, but they are multiply *realizable*. Fodor (1974/1980), famously, argues:

The reason it is unlikely that every kind corresponds to a physical kind is just that (a) interesting generalizations (e.g., counterfactual supporting generalizations) can often be made about events whose physical descriptions have nothing in common; (b) it is often the case that *whether* the physical descriptions of the events subsumed by such generalizations have anything in common is, in an obvious sense, entirely irrelevant to the truth of the generalizations, or to their interestingness, or to their degree of confirmation, or, indeed, to any of their epistemologically important properties; and (c) the special sciences are very much in the business of formulating generalizations of this kind. (p. 124)

Clause (a) asserts *Actual Variation*, but we have already seen that the evidence for that claim is weak or inconclusive. Clause (b) asserts *Nomological Variation*, and the proffered reasons for believing it seem to be (a) and (c), the latter being that we have successful special sciences of multiply realizable kinds. But since there is no reason to accept (a), *Actual Variation*, there is no reason to think the evidence for *Actual Variation* would also tend to support *Nomological Variation*. The burden then falls to (c), of which Fodor's example is economics. Unfortunately the case for (c) is not very strong, and it is not at all clear how much weight can be borne by the analogy with economics (again, see my 2009a, and Shapiro, 2004b). Moreover, like *Actual Variation* it is not clear whether the kind of multiplicity that would be supported by *Nomological Variation* would be different enough to be a problem for identity theorists. To count against the identity theory it would have to be variation sufficient to ensure that there could not be any neurological law that unifies the realizer phenomena, but nevertheless with similarity enough that the variants still fall under the same sensation kind (Kim, 1972, 1989, 1993; Polger, 2009a; Shapiro, 2000, 2004a, 2008). But, once again, lacking evidence of *Actual Variation* of this sort, it's not clear what non-question-begging reasons one would have to predict that kind of *Nomological Variation*. So while thinking in terms of *Nomological Variation* might render (P2) acceptable, it makes (P3) questionable.

Our interim assessment is that whereas multiple realization and multiple realizability arguments were widely taken to tell decisively against the identity theory for many years, today they are very much under review. A modest conclusion is that the jury is still out. A stronger conclusion is that we do not have reason to believe in *Actual Variation* or *Nomological Variation* of sorts that are problematic for identity theories.

Putnam's and Fodor's multiple realization and realizability arguments against the identity theory are scientific or metascientific (Fodor, 1974/1980; Putnam, 1967, 1975). They purport to appeal to actual evidence, or to the actual structure of successful scientific theories. Kripke's (1971, 1972/1980) argument against physicalism in general and against the identity theory in particular does not rely on actual or nomologically possible variation. Instead, he tries to demonstrate that the identity theory is false because identities are necessarily true if true, whereas for sensations and brain processes there is *Metaphysical Variation*. Kripke, recall, gives us the

conceptual tools to distinguish the identity theory's metaphysical claims from apparently related epistemic or semantic claims. These tools help to bolster Smart's responses to the original objections and replies. But Kripke's contribution is a two-edged sword, because it includes the claim that identities are necessary, that is, true in all possible worlds.¹⁶ And consequently if it is even metaphysically possible that this one-to-one correspondence breaks down then the identity claim is falsified.

Now one reason for thinking that there can be *Metaphysical Variation* would be that there is reason to believe in *Actual Variation* or *Nomological Variation*. Lacking those kinds of reasons, the reason to believe in *Metaphysical Variation* is simply that it seems possible, and there are no deflationary explanations for the seeming possibility. Kripke claims that no deflationary explanation is available in the case of sensations and brain processes. His preferred strategy for deflating apparent possibilities is to explain how we can mistake a necessary claim for a different claim that is genuinely contingent but which is a "qualitative analogue" of the necessary claim in question, an alternative claim to which we could be in the "same epistemic situation" (Kripke, 1972/1980, p. 152). So though we might think that water could fail to be H₂O, what we are really conceiving of is that some substance qualitatively like water could fail to be H₂O. The latter claim is true, contingent, and compatible with the necessary identity of water and H₂O (Kim, 1972; Kripke, 1971, 1972/1980; see also Levine, 1983; Lycan, 1974, 1987; Papineau, 2007; Polger, 2004).

But Kripke (1972/1980) claims that this strategy cannot be used in the case of sensations and brain processes:

To be in the same epistemic situation that would obtain if one had a pain *is* to have a pain; to be in the same epistemic situation that would obtain in the absence of pain *is* not to have a pain. The apparent contingency of the connection between the mental state and the corresponding brain state thus cannot be explained by some qualitative analogue. (p. 152)

That is, whatever is qualitatively like pain is a pain. So the seeming that pain could fail to be identical to a brain process cannot be confused with a seeming of something else that is similar to pain failing to be a brain process. And Kripke does not think that any other deflationary explanations are available, saying that an alternative model "requires some very different philosophical argument . . . And it would have to be a deeper and subtler argument than I can fathom and subtler than has ever appeared in any materialist literature that I have read" (1971, p. 163). If Kripke is correct, then the new strength that he has given the identity theory in the availability of necessary a posteriori identities is also a weakness, for the new theory can be deflated by the mere possibility that the identity fails.

Fortunately for the identity theorist, physicalists have been quite unmoved by Kripke's argument. Most doubt the alleged connection between conceivability and possibility, even in its weakened form. Additionally some find Kripke's reasoning to be question begging (Gjelsvik, 1987; Lycan, 1974, 1987) or ad hominem (Papineau, 2007). The charge that the argument is question begging is particularly easy to see.

After all, the post-Kripke identity theorist asserts that sensations are necessarily identical to brain processes and ipso facto denies *Metaphysical Variation*. Against such an identity theorist it is no good to simply assert *Metaphysical Variation*. Of course one might, following Kripke, challenge the identity theorist to provide some explanation for the false appearance of contingency. It's not clear that the identity theorist owes such an explanation; after all, post-Kripke she can claim to be making a squarely metaphysical claim, and have no epistemic commitments. But more than a few philosophers, including myself, have been willing to offer alternatives to Kripke's model for explaining away the apparent contingency, should it be required after all (see my 2004; for various other responses, see Bealer, 1994; Feldman, 1973; Gjelsvik, 1987; Hill, 1981, 1991; Levin, 1991). The upshot is that Kripke's *Metaphysical Variation* objection to the identity theory, taken at face value, has been well answered.

But I say that Kripke's objection has been well answered when "taken at face value" because there has recently emerged a new kind of argument that embraces the a posteriori identity theorist's response to Kripke and uses it as a premise in a new objection, or (at least) a new version of Black's objection. According to this line of reasoning, any theory that takes the identity of sensations and brain processes to be necessary and a posteriori is compatible with a kind of dualism. And this is a violation of the spirit if not the letter of the identity theory, an arch physicalist theory if ever there was one. The trouble is this: if the relation between sensations and brain processes is not a priori, then there will be no logically necessary physical conditions of brain processes that entail that they are (identical to) sensations. So although the connection might be metaphysically necessary, it will nevertheless be logically contingent. That is, there will be *Logical Variation*.¹⁷ Now on some views of the relation between metaphysical and logical necessity, it will be a flat contradiction to assert that something is metaphysically necessary but logically contingent. These views often identify metaphysical and logical necessity; and, indeed, the advocates of the *Logical Variation* objection tend to hold just such views (e.g., Chalmers, 1996; Chalmers & Jackson, 2001; Jackson, 1998). But identity theorists tend not to hold such views about metaphysical modality, so the argument cannot claim to catch them in a contradiction.

Instead the objector claims that the identity theorists' admission of *Logical Variation* shows that even if there is an ontological identity of sensations and brain processes there is not an identity of sensation facts and brain process facts, or of sensation properties and brain process properties. (For if there were, we would be able to know the identities a priori, at least given sufficient physical information about the world.)¹⁸ This new objection is parallel to Black's old argument that the identity theorist might be able to identify mental and brain processes but that the lack of a priori connection showed that they could not identify mental and brain properties. And its advocates attempt to push that similarity. They say that the a posteriori identity theory falls short of its goals: "ontologically... it is compatible with a materialist ontology on which the explained phenomenon is ultimately

physical. But epistemically, it is more akin to . . . property dualism” (Chalmers & Jackson, 2001, p. 353).

Much ink has been spilled to explain why this new version of Black’s objection should not bother any physicalist and in particular should not worry an identity theorist (Block & Stalnaker, 1999; Byrne, 1999; Hawthorne, 2002; Hill, 1998; Hill & McLaughlin, 1999; Lycan, 2003, 2009; McLaughlin, 2005; Wilson, 2005; Wright, 2007; more generally, see Williamson, 2005; Yablo, 2000). The most straightforward complaint is that the comparison to property dualism is gratuitous. The only sense in which the views are similar is that they deny a logical connection between sensations and brain processes. But that does not amount to any kind of dualism, only to the rejection of certain positivist ideas about the “logical” construction of the world, which we had good reason to reject quite independently of the merits of an identity theory. In particular, the a posteriori identity theorist quite reasonably rejects the problematic notion of “logical” conditions and the positivist demand for a special kind of “reduction” of which there are no non-trivial examples and that has long since been rejected by philosophers of science. The burden is on the objector to show independently that the identity theorist, or any physicalist, should require such reductions. And no such positive argument has been given.¹⁹

5. The Ten Commandments of Physicalism

From Smart’s original list of theses, the contemporary identity theorist should maintain almost all. Certainly the contemporary identity theorist should maintain (1)–(6):

- (1) *Realism*. Sensation reports are genuine reports.
- (2) *Physicalism*. Sensation reports do not refer to anything irreducibly psychical.
- (3) *Minimal Reductionism*. Sensations are “nothing over and above” brain processes.
- (4) *Identity*. Sensations are identical to brain processes.
- (5) *Metaphysical*. The identity theory is a metaphysical theory, not a semantic proposal or an empirical hypothesis.
- (6) *Theoretical*. Metaphysical theories of the nature of the mind do not make competing empirical predictions; so they should be evaluated by their theoretical virtues, e.g., simplicity and parsimony.

Of these, the only one in serious question is (3), minimal reductionism. Given the sordid history of so-called reductionisms, identity theorists may want to distance themselves from anything that goes by that name. But notice that the sense of reduction in (3) as “nothing over and above” is rather weak; it certainly carries no commitment to any controversial thesis of theoretical or explanatory reduction. Indeed, there is a case to be made that (3) is merely redundant of (2).

What of the other claims? Of particular importance is (5), for it helps us to understand how the contemporary identity theorist interprets (4) and (6). The identity theorist thinks that sensations and brain processes are identical, and that that identity should be modeled on other scientific identity claims. This much Smart

argued. The contemporary identity theorist thinks that such identities are necessary and a posteriori. That they are necessary is, as noted above, a change from the views of Smart and other early identity theorists; for those theorists thought that the a posterioricity of the relation required that it be contingent. That was the reasoning that Kripke debunked. We need not add the necessity of identity as an independent thesis, for it is simply part and parcel of the current understanding of genuine or “strict” identities.²⁰ But not all identities are a posteriori, some are a priori.²¹ Contemporary identity theorists deny that mind–brain identities are of the a priori sort. So contemporary identity theorists are a posteriori physicalists, or “type-B” physicalists in David Chalmers’ (1996) taxonomy.

By insisting that these identities are a posteriori the contemporary identity theorist rejects (7), the idea that there are “logically” necessary conditions for being that thing a thing of any given kind. Instead, the contemporary identity theorist adopts (7*):

(7*) *A Posteriori*. The identity of sensations and brain processes is a posteriori.

(7*) carries no endorsement of the requirement for “logically” necessary conditions of identity, like those cited in (7).²² It is a genuine a posteriori necessity. The a posterioricity of the identity of sensations and brain processes explains why sensation and brain process concepts, terms, and beliefs have different “logics,” that is, why they play different roles in our reasoning. But that they play different roles in our reasoning is no reason to reject the ontological thesis of identity, as it might have been before Kripke.

Although the identity theory holds that the mind–brain relation is a posteriori, the contemporary identity theorist does not favor the theory on the grounds that it uniquely predicts distinctive observations of the behavior of creatures with brains. So Smart’s (6) is acceptable to contemporary identity theorists, provided it is not too narrowly interpreted: the identity theory should be favored for broadly theoretical reasons. Whether simplicity and parsimony are the best reasons to favor the theory is another matter. They may be. But they are at least examples of such reasons. There are also what Jaegwon Kim (2005) has called explanatory and causal arguments for the identity theory. But all of these can be broadly thought of as appealing to a kind of “inference to the best explanation,” provided we think of that as a general method of reaching reflective equilibrium rather than as a specific predictive framework.²³ And that is how we ought to think of it.

Moreover, the contemporary identity theory is compatible with Smart’s original (8):

(8) *Topic Neutrality*. Sensation expressions are topic neutral.

In fact (8) is stronger than the identity theorist requires, for all we need is that sensation expressions are not “logically” incompatible with mind–brain identity claims. This would be the case if sensation expressions are topic neutral, or if they are in fact unrecognized “logically” physicalist expressions.

What other theses should the contemporary identity theorist adopt? Let me suggest two, although these are plainly more controversial than (1)–(8). First, the identity

theorist should not dismiss the kinds of empirical evidence and common-sense observations that give rise to the multiple realizability arguments. The identity theorist should be entirely comfortable with the idea that some sensations are had by members of diverse biological species, and that neural plasticity is common. It is clear that the natural world boils with variability in many ways and at many levels. So the identity theorist should allow:

(9) *Variability*. Sensation processes are multiply constituted.²⁴

But accepting that there is much variability in the world is a far cry from accepting that it is the kind of variability that would be problematic for identity theories. Identity theories claim that sensations are brain processes, but they do not take any stand on the nature of brain processes. In particular, the identity theorist need not suppose that the world is organized into homogeneous columns of organization so that there is a one-to-one relation between sensations and microphysical processes. The identity theorist identifies sensations with brain processes, not with molecular or subatomic processes that occur inside brains.²⁵ The contrast is with dualism (sensations are psychological processes), behaviorism (sensations are syndromes of behavior and dispositions to behave), functionalism (sensations are biological abstract computational or otherwise “functional” processes), eliminativism (there are no sensations), and the like. How brain processes relate to microphysical processes is an important question, but it is not a question to which an identity theorist must provide an answer.

What else? Identity theorists, being physicalists who take the mind–brain relation to be both necessary and a posteriori, have a special concern for the status of physicalism itself. To see why, consider the following *reductio* argument against the identity theory:

- C1. Sensations are identical to brain processes in all possible worlds. (identity theory)
- C2. Physicalism is contingent; there are some nonphysicalist worlds containing nonphysical sensations. (contingent physicalism)²⁶
- C3. There are some worlds in which sensations are not identical to brain processes. (from C2)
- C4. The identity theory is false.

Now one could avoid this argument by giving up (C1) and arguing that it is sufficient that sensations are physically “realized” in this world. But this is to abandon the identity theory, and introduces a well-known question about the robustness of the resulting physicalism. The identity theorist instead avoids the above *reductio* by denying (C2), the claim that physicalism is contingent. If sensations are identical to brain processes in all possible worlds then we require:

(10) *Strong Physicalism*. Physicalism is necessarily true; all worlds are physicalist worlds.

A meta-metaphysical claim like (10) may be seen as quite radical and unnecessarily inflammatory for collegial physicalists who have wanted to allow that even if dualism

is false it is not necessarily false. But so it goes. Just as there are necessary a posteriori truths, there are necessary a posteriori falsehoods. And if the identity theorist is correct then it is necessary that dualisms (or anti-physicalisms generally) are false. If any worlds contain any nonphysical sensations then the identity theory is false, so the identity theorist should accept (10).²⁷

6. Conclusion

To many philosophy students, the identity theory of sensations is a historical curiosity on par with phlogiston theory of combustion. But if I am right, the identity theory has been a victim of bad publicity. Fifty years later, J. J. C. Smart's defense of the theory stands up in substance, and largely in detail. Where Smart's defense is weakest, contemporary identity theorists can supplement his arguments with the resources of our post-Kripke metaphysics. The view that we now defend has all of the central features that Smart defended, and it withstands the influential arguments that are widely thought to be its demise. So I say, with Smart, "why should not sensations just be brain processes of a certain sort?" (p. 144).

Acknowledgments

I benefited greatly from discussions of this paper with Tom Bontly, George Graham, Doug Keaton, Michael Lynch, Bob Richardson, Larry Shapiro, and Hayden Thornburg. I would also like to thank Bill Bechtel and two helpful referees for this journal for their advice and guidance. This research was made possible in part through the support of the Charles P. Taft Research Center for Humanities at the University of Cincinnati.

Notes

- [1] It is hard to lay this mantle on any one individual. The credit goes in part to Smart, but also to Place (1956) and Feigl (1958). But of course they had their own predecessors.
- [2] All page numbers refer to this article unless otherwise noted.
- [3] Though cracks in that latter consensus have appeared. See Chalmers (1996) and Jackson (1998), discussed below.
- [4] Smart hedges his conclusion by prefacing the qualification, "assuming that a behavioristic reduction of introspective reports is not possible" (1959, p. 156). But that qualification is unnecessary. Even if a behaviorist reduction were possible it would not make for a predictively distinctive theory, and considerations of simplicity and parsimony would still favor the identity theory.
- [5] That being said, Smart has only considered two of the kinds of argument for identity theories that have gained currency, one from straightforward empirical data, and one from simplicity. There are also semantic arguments, causal arguments, and inference to the best explanation arguments. We will return to these shortly.
- [6] In doing so, Smart applies the criteria of scientific theories to metaphysical theories, on the assumption that competing metaphysical theories all fit the data equally well.

- [7] From the “Australian” approach to the philosophy of mind it is only a few short assumptions to the “Canberra Plan.” See the essays in Braddon-Mitchell and Nola (2009).
- [8] Notice that notion of “logical” necessitation here is a semantic or epistemic one: It is the notion of “logic” according to which it is a “logical” truth that bachelors are not married, or that what has shape also has color. For example, Place proposes that one of these “logical” requirements is that “the process or event observed in or inferred from the second set of observations should provide us with an explanation...of the very fact that such observations are made” (p. 101).
- [9] There is a case to be made for calling the a priorist idea the eighth thesis to which Smart is committed. And doing so brings him even closer to contemporary “Canberra Planners.” I omit it because it seems to play no special part in Smart’s arguments for the identity theory, and there is reason to think that he would reject it if given an alternative (Lycan, 1987).
- [10] Lycan (1987) attributes the view that the topic-neutral expressions must be translations of sensation talk to Armstrong and Lewis, and “Smart (perhaps)” (p. 9). I would say, “and not Smart.” Lycan also discusses the point made herein, that there is no obstacle to the identity theorist claiming (as I say that Smart does) that sensation talk is already topic neutral and not in need of neutralizing translation.
- [11] That being said, the prospect of topic-neutral glosses, along with the claim that the mind–brain identity claims are both a posteriori and contingent, set the stage for David Lewis’s (1966, 1970, 1972) proposed arguments for the identity theory as well as subsequent functionalist theories.
- [12] See Rorty (1967/1992), and more recently Soames (2005) on the positivist and post-positivist notion of a “logic.” See also Smart (2007) on Place’s use.
- [13] Ironically, the very resources that can help current identity theorists answer the original objections can also be turned upon them.
- [14] As usual, we are taking this to be a claim about sensation types and brain process types.
- [15] About the requirement that the sensations be of exactly the same sort, see my (2002, 2004).
- [16] More cautiously, identity statements asserting an identity between entities (entity) rigidly designated are true in all possible worlds in which the thing exists.
- [17] Notice the use of something like Place and Smart’s old Positivist notion of “logical” necessity.
- [18] See Jackson’s (1982) “knowledge argument.” One way to get from “fact dualism” to “property dualism” is by way of a truthmaker theory: if there are distinct facts, then there must be distinct truthmakers for those facts.
- [19] See my (2008), where I argue that the purported positive arguments are actually negative arguments that depend on a problematic *reductio* argument.
- [20] However Smart (2007) says that identities are “half contingent,” raising the possibility that he is abandoning a strict identity theory for a view more like that of Armstrong and Lewis.
- [21] Or as a priori as anything can be, at any rate. If anything is a priori then the fact that $a = a$ is a priori.
- [22] Whether (7*) is equivalent to or entails the denial of (7) is not pressing.
- [23] Here I am suggesting, but not arguing, that Kim (2005) gives “inference to the best explanation” an overly narrow reading.
- [24] Here I use “constitution” in the generic way, not to name a particular metaphysical relation involving overlap.
- [25] I would like to thank an anonymous referee for this journal for pressing me to clarify my claims about variability.
- [26] See Lewis (1994) and Jackson (1998). If other worlds contain nonphysical things that are not sensations, then this is no problem for the identity theory, though it may still be a problem for general physicalists.
- [27] Or at least: (10*) All sensation-containing worlds are physicalist worlds.

References

- Armstrong, D. (1968). *A materialist theory of mind*. London: Routledge and Kegan Paul.
- Bealer, G. (1994). Mental properties. *Journal of Philosophy*, 91(4), 185–208.
- Bechtel, W., & McCauley, R. (1999). Heuristic identity theory (or back to the future): The mind-body problem against the background of research strategies in cognitive neuroscience. In M. Hahn & S. C. Stoness (Eds.), *Proceedings of the 21st annual meeting of the Cognitive Science Society* (pp. 67–72). Mahwah, NJ: Lawrence Erlbaum Associates.
- Bechtel, W., & Mundale, J. (1999). Multiple realizability revisited: Linking cognitive and neural states. *Philosophy of Science*, 66, 175–207.
- Block, N., & Stalnaker, R. (1999). Conceptual analysis, dualism, and the explanatory gap. *Philosophical Review*, 108(1), 1–46.
- Braddon-Mitchell, & Nola, R. (2009). *Conceptual analysis and philosophical naturalism*. Cambridge, MA: MIT Press.
- Byrne, A. (1999). Cosmic hermeneutics. *Philosophical Perspectives*, 13, 347–383.
- Chalmers, D. (1996). *The conscious mind: In search of a fundamental theory*. New York: Oxford University Press.
- Chalmers, D., & Jackson, F. (2001). Conceptual analysis and reductive explanation. *Philosophical Review*, 110(3), 315–361.
- Feigl, H. (1958). The “mental” and the “physical”. In H. Feigl, M. Scriven, & G. Maxwell (Eds.), *Minnesota studies in the philosophy of science: Vol. 2. Concepts, theories, and the mind-body problem* (pp. 370–497). Minneapolis: University of Minnesota Press.
- Feldman, F. (1973). Kripke’s argument against materialism. *Philosophical Studies*, 24(6), 416–419.
- Fodor, J. (1974). Special sciences, or the disunity of science as a working hypothesis. *Synthese*, 28, 97–115. (Reprinted in *Readings in Philosophy of Psychology*, Vol. 1, pp. 120–133, by N. Block, Ed., 1980, Cambridge, MA: Harvard University Press).
- Gjelsvik, O. (1987). A Kripkean objection to Kripke’s argument against identity theories. *Inquiry*, 30, 435–450.
- Hawthorne, J. (2002). Advice for physicalists. *Philosophical Studies*, 108, 17–52.
- Hill, C. (1981). Why Cartesian intuitions are compatible with the identity thesis. *Philosophy and Phenomenological Research*, 42(2), 254–265.
- Hill, C. (1991). *Sensations: A defense of type materialism*. Cambridge, UK: Cambridge University Press.
- Hill, C. (1998). Chalmers on the a priority of modal knowledge. *Analysis*, 58(1), 20–26.
- Hill, C., & McLaughlin, B. (1999). There are fewer things in reality than are dreamt of in Chalmers’ philosophy. *Philosophy and Phenomenological Research*, 59, 445–454.
- Jackson, F. (1982). Epiphenomenal qualia. *The Philosophical Quarterly*, 32(127), 127–136.
- Jackson, F. (1998). *From metaphysics to ethics: A defense of conceptual analysis*. Oxford: Oxford University Press.
- Kim, J. (1972). Phenomenal properties, psychophysical laws, and identity theory. *Monist*, 56(2), 177–192.
- Kim, J. (1989). The myth of nonreductive materialism. *Proceedings and Addresses of the American Philosophical Association*, 63(3), 31–47.
- Kim, J. (1993). *Supervenience and mind*. New York: Cambridge University Press.
- Kim, J. (1998). *Mind in a physical world: An essay on the mind-body problem and mental causation*. Cambridge, MA: MIT Press.
- Kim, J. (2005). *Physicalism, or something near enough*. Princeton: Princeton University Press.
- Kripke, S. (1971). Identity and necessity. In M. Munitz (Ed.), *Identity and individuation* (pp. 135–164). New York: New York University Press.
- Kripke, S. (1980). *Naming and necessity*. Cambridge, MA: Harvard University Press. (Original work published 1972).

- Levin, J. (1991). Analytic functionalism and the reduction of phenomenal states. *Philosophical Studies*, 61(3), 211–238.
- Levine, J. (1983). Materialism and qualia: The explanatory gap. *Pacific Philosophical Quarterly*, 64, 354–361.
- Lewis, D. (1966). An argument for the identity theory. *Journal of Philosophy*, 63, 17–25.
- Lewis, D. (1969). [Review of Art, Mind, and Religion]. *Journal of Philosophy*, 66, 23–35.
- Lewis, D. (1970). How to define theoretical terms. *Journal of Philosophy*, 68, 203–211.
- Lewis, D. (1972). Psychophysical and theoretical identifications. *The Australasian Journal of Philosophy*, 50, 249–258.
- Lewis, D. (1980). Mad pain and Martian pain. In N. Block (Ed.), *Readings in philosophy of psychology* (Vol. 1, pp. 216–222). Cambridge, MA: Harvard University Press.
- Lewis, D. (1994). Reduction of mind. In S. Guttenplan (Ed.), *A companion to philosophy of mind* (pp. 412–431). Oxford: Blackwell.
- Lycan, W. (1974). Kripke and the materialists. *Journal of Philosophy*, 71(18), 677–689.
- Lycan, W. (1987). *Consciousness*. Cambridge, MA: MIT Press.
- Lycan, W. (2003). Vs. a new a priorist argument for dualism. *Philosophical Issues*, 13, 130–147.
- Lycan, W. (2009). Serious metaphysics: Frank Jackson’s defense of conceptual analysis. In I. Ravenscroft (Ed.), *Minds, ethics, and conditionals: Themes from the philosophy of Frank Jackson* (pp. 61–84). Oxford: Oxford University Press.
- McLaughlin, B. (2005). A priori versus a posteriori physicalism. In C. Nimtz & A. Beckermann (Eds.), *Philosophy – science – scientific philosophy: Main lectures and colloquia of GAP.5: Fifth international congress of the Society for Analytical Philosophy, Bielefeld, 22–26 September 2003*. Paderborn, Germany: mentis.
- Papineau, D. (2007). Kripke’s argument is ad hominem not two-dimensional. *Philosophical Perspectives*, 21, 475–494.
- Place, U. T. (1956). Is consciousness a brain process? *British Journal of Psychology*, 47, 44–50.
- Place, U. T. (1960). Materialism as a scientific hypothesis. *Philosophical Review*, 69, 101–104.
- Place, U. T. (1988). Thirty years on—Is consciousness still a brain process? *Australasian Journal of Philosophy*, 66, 208–219.
- Polger, T. (2002). Putnam’s intuition. *Philosophical Studies*, 109(2), 143–170.
- Polger, T. (2004). *Natural minds*. Cambridge, MA: MIT Press.
- Polger, T. (2008). H₂O, ‘water’, and transparent reduction. *Erkenntnis*, 69(1), 109–130.
- Polger, T. (2009a). Evaluating the evidence for multiple realization. *Synthese*, 167(3), 457–472.
- Polger, T. (2009b). Two confusions concerning multiple realizability. *Philosophy of Science*, 75(5), 537–547.
- Putnam, H. (1967). Psychological predicates. In W. H. Capitan & D. D. Merrill (Eds.), *Art, mind and religion*, (pp. 37–48). Pittsburgh: University of Pittsburgh Press. (Reprinted as “The Nature of Mental States” in *Philosophical Papers: Vol. 2. Mind, Language and Reality* (pp. 429–440). New York: Cambridge University Press).
- Putnam, H. (1975). Philosophy and our mental life. In H. Putnam (Ed.), *Philosophical Papers: Vol. 2. Mind, Language and Reality* (pp. 291–303). New York: Cambridge University Press.
- Quine, W. V. O. (1948). On what there is. *The Review of Metaphysics*, 2(5), 21–38.
- Rorty, R. (1992). Metaphilosophical difficulties of linguistic philosophy. In R. Rorty (Ed.), *The linguistic turn: Essays in philosophical method* (pp. 1–39). Chicago: Chicago University Press (Original work published 1967).
- Shapiro, L. (2000). Multiple realizations. *Journal of Philosophy*, 97, 635–654.
- Shapiro, L. (2004a). *The mind incarnate*. Cambridge, MA: MIT Press.
- Shapiro, L. (2004b). *Special special sciences*. Unpublished manuscript.
- Shapiro, L. (2008). How to test for multiple realization. *Philosophy of Science*, 75, 514–525.
- Smart, J. J. C. (1959). Sensations and brain processes. *Philosophical Review*, 68(2), 141–156.
- Smart, J. J. C. (1961). Further remarks on sensations and brain processes. *Philosophical Review*, 70(3), 406–407.

- Smart, J. J. C. (2007). The identity theory of mind (E. N. Zalta, Ed.), *The Stanford Encyclopedia of Philosophy*. Retrieved December 16, 2009, from <http://plato.stanford.edu/entries/mind-identity>
- Soames, S. (2005). *Philosophical analysis in the 20th century* (Vol. 1). Princeton, NJ: Princeton University Press.
- Williamson, T. (2005). Armchair philosophy, metaphysical modality and counterfactual thinking. *Proceedings of the Aristotelian Society*, 105(1), 1–23.
- Wilson, J. (2005). Supervenience-based formulations of physicalism. *Nous*, 39(3), 426–459.
- Wright, W. (2007). Explanation and the hard problem. *Philosophical Studies*, 132, 301–330.
- Yablo, S. (2000). Textbook Kripkeanism and the open texture of concepts. *Pacific Philosophical Quarterly*, 81, 98–122.