Access Disunity without Phenomenal Disunity: Tye on Split-Brain Cases

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Split-brain cases appear to have significant implications for the unity of consciousness. Arguably, they show that the conscious states of a single subject at a time need not be jointly accessible. It is less clear that these cases also show that such states need not be jointly experienced. Michael Tye (2004) argues that the cases do have that implication, and Timothy Bayne and David Chalmers (2003) argue that they do not. I will develop two objections to Tye's arguments. First, an analogy to blindsight on which he relies is questionable. Second, even if his analogy succeeds, it shows only that a single person can simultaneously have two separate sets of phenomenally conscious mental states. That result fails to undermine the phenomenal-unity thesis that Bayne and Chalmers defend, on which phenomenal consciousness is necessarily unified.

1. Access unity and phenomenal unity

Before turning to split-brain cases, let me note two distinctions. One is Ned Block's (1995) distinction between access consciousness and phenomenal consciousness. A mental state is *access conscious* if, in virtue of having it, its content is available for verbal report, rational inference, and deliberate control of behavior. For example, perceiving the coffee mug on my desk produces in me an access-conscious state. I can describe the mug's shape and color, draw inferences about how much coffee the mug holds, and use this information to decide how much to make. A mental state is *phenomenally conscious* if there is something it is like to be in that state. For example,

looking at the mug produces in me a state with a certain phenomenal character: there is something it is like to visually experience the mug as I now do.

Block gives several reasons for thinking that access consciousness and phenomenal consciousness can come apart. For example, he writes (using "A-consciousness" for "access consciousness" and "P-consciousness" for "phenomenal consciousness"),

> Suppose that you are engaged in intense conversation when suddenly at noon you realize that right outside your window, there is—and has been for some time—a pneumatic drill digging up the street. …you were P-conscious of the noise all along, but at noon you are both P-conscious *and* A-conscious of it. (Block 1995, p. 234)

On Block's view, before noon you had states that exhibited phenomenal consciousness without access consciousness. Likewise, he makes a case for the possibility of access consciousness without phenomenal consciousness. His arguments have been contested.[1] But most agree that the two notions differ—that there is at least a conceptual distinction between access consciousness and phenomenal consciousness.[2]

As Bayne and Chalmers note, Block's distinction yields a corresponding distinction between access unity and phenomenal unity:

[1] See Chalmers 1996, chapter 6.
[2] However, see Dennett 2005.

> Broadly speaking, two conscious states are *access unified* when they are jointly accessible: that is, when the subject has access to the contents of both states at once. Two conscious states are *phenomenally* unified when they are jointly experienced: when there is something unified it is like to be in both states at once. (Bayne and Chalmers 2003, p. 29)

If Block's distinction is coherent, then so is the corresponding distinction that Bayne and Chalmers draw. And they argue that the notions of access unity and phenomenal unity are at least conceptually distinct. If they are correct, then there is a nontrivial question about whether instances of access disunity indicate that phenomenal consciousness can also lack unity—and thus whether, assuming split-brain cases involve access disunity, such cases also involve phenomenal disunity. Let us turn to these cases.

2. Split-brain cases

The startling empirical data concerning commissurotomy are well known. Severing the corpus callosum produces a kind of mental bifurcation (Sperry 1968). In one experiment, a garlic smell is presented to a patient's right nostril. When asked to point with her left hand to the source of the smell, she selects a clove of garlic. At the same time, she verbally denies that she detects any unusual smell. In a case Tye (2004) discusses, the patient, *S*, is shown different words in different halves of his visual field: 'pen' on the left and 'knife' on the right. When asked to report what he saw, he says only 'knife', since the left hemisphere, which dominates speech, receives input from the right visual field. But when asked to write down what he saw with his left hand, which is

controlled by the right hemisphere, he slowly writes ‘pen’. If he writes ‘pen’ with his left hand in the right visual field, his right hand may cross out ‘pen’ and write ‘knife’.

3. Tye’s case for phenomenal disunity

Tye writes,

> [S]plit-brain subjects are single persons whose phenomenal consciousness is briefly split into two under certain special experimental conditions, but whose [phenomenal] consciousness at other times is unified. (Tye 2004, p. 113)[3]

He takes this to imply that split-brain patients sometimes lack both access unity and phenomenal unity.

Tye’s reasons for the first part of that claim, about access disunity, are straightforward. Consider the experiment in which the words ‘pen’ and ‘knife’ are presented to split-brain patient *S*’s left and right visual fields. *S*’s behavior indicates that he has at least limited access to the contents of the states that result from his seeing the displays. The two separate items of perceived information are available to him for verbal report, and he uses them in reasoning and in the deliberate control of behavior. But he appears to lack access to both items at once—to a conjunctive content involving both ‘pen’ and ‘knife’. If he does lack such access, then his condition involves a breakdown of access unity—at least under experimental conditions, assuming he is a single subject.

The foregoing reasoning is not distinctive to Tye’s interpretation of the split-brain experiments. Indeed, the reasoning is consistent with most interpretations, and I will

[3] For a similar view, see Marks 1980.

assume it is correct. Further, Tye agrees with Bayne and Chalmers that access disunity does not immediately entail phenomenal disunity. But he argues that the breakdown of access unity found in split-brain cases is best explained by a corresponding breakdown of phenomenal unity, and here his reasoning is distinctive.

Tye's argument makes central use of a comparison to blindsight (Weiskrantz 1986). People with blindsight have large blind areas in their visual fields, due to damage in the postgeniculate regions of their brains. Yet they respond to visual stimuli that are presented to those blind areas. For example, when prompted, they tend to make surprisingly accurate "guesses" about the presence, movement, and orientation of such stimuli. They tend to insist that they are merely guessing, but nonetheless guess correctly at a statistically significant rate.

Even so, the guessing abilities of blindsight patients are considerably limited when compared to judgments made in similar situations by normally sighted people. For example, if you quietly place a glass of water before a thirsty blindsighted person, she will not recognize it as a glass of water; she will not reach for it. Thus, Tye writes, "In the case of the thirsty blindsight subject, we can agree that there is no access consciousness with respect to the glass" (2004, p. 124).[4] As Tye emphasizes, the lack of access consciousness in this case requires explanation. On his view, the correct explanation will appeal to a deficiency in the blindsight subject's phenomenal consciousness: she has no conscious experiences corresponding to her blind field, even though she receives information from it.

[4] Tye claims that the thirsty blindsight subject lacks access consciousness of, for example, the content *that there is a glass of water in front of me.* Tye does not say whether, on his view, there is some less specific content of which she is access conscious, e.g., *that there is an object in front of me.*

Tye suggests that we draw a parallel moral about split-brain cases. *S* has access to contents involving 'pen' and contents involving 'knife' but lacks access to a conjunctive content involving both 'pen' and 'knife'. This breakdown of access unity requires explanation, just as the breakdown of access consciousness in blindsight does. The correct explanation, according to Tye, is that *S*'s phenomenal consciousness is disunified: "He does not experience the two words together. That's why access consciousness of both is missing" (2004, p. 125).

Some might object that the idea of a breakdown of phenomenal unity (in a single subject) is inconceivable. Tye acknowledges this concern, citing Bayne and Chalmers' article. But he believes the concern is baseless. He writes, "there is no difficulty in imagining the mental life of a split-brain patient, under the phenomenal disunity assumption" (2004, p. 125). Under this assumption, *S* does not experience a conjunctive state involving perception of 'pen' and 'knife'. Tye also writes,

> [T]here is nothing it is like for *S* to undergo the conjunctive state and, generalizing, nothing special it is like for split-brain patients. Of course, there is something it is like for *S* to experience 'pen', and further there is something it is like for *S* to experience 'knife'. But what these states are like is just what they are like for anyone else. (Tye 2004, p. 120)

Tye concludes that there is no good reason to resist the hypothesis that split-brain cases involve a breakdown of phenomenal disunity—a hypothesis that, he claims, has both intuitive plausibility and considerable explanatory value.

4. On Tye's blindsight analogy

In this section and the next, I will challenge Tye's case for phenomenal disunity. I begin with his analogy to blindsight. Some aspects of his analysis of blindsight are controversial, e.g., his claim that, "The function (or a function) of phenomenal consciousness is simply to enable creatures to use information represented in their brains in the guidance of rational action (as contrasted with guessing behavior)" (2004, p. 122).[5] But I will assume his analysis is correct and focus on his analogy to split-brain cases.

Tye is certainly right to raise the question of what explains the breakdown of access unity found in split-brain cases. And his analogy to blindsight is suggestive: it raises the possibility of a parallel explanation in terms of phenomenal disunity. But he claims that the phenomenal-disunity hypothesis provides "the most straightforward explanation" (Tye 2004, p. 125) of the access disunity manifested in the case of *S*, and he implies that this explanation is the best available. Yet he provides scant evidence for those assessments. In particular, he fails to compare his favored analysis to an alternative that Bayne and Chalmers suggest. The alternative is inspired by an experiment by George Sperling (1960), which Block (1995) also discusses. Bayne and Chalmers write,

> In Sperling's experiment, a subject is presented with a matrix consisting of three rows with four letters each. The matrix is flashed only briefly, for 250 milliseconds. After the matrix vanishes, a tone sounds, indicating whether the subject is to report the contents of the first, second, or third row. When subjects

[5] Those sympathetic with epiphenomenalism, for example, might challenge this claim. See Chalmers 1996 and Robinson 1982.

> are required to report the contents of the top row, on average they correctly report 3.3 of the four letters in that row. The same goes when they are required to report the contents of the middle row, or of the bottom row. But when subjects are asked to report the contents of the entire matrix, on average they correctly report 4.5 of the twelve letters. (Bayne and Chalmers 2003, p. 35)

On a natural interpretation of this case—suggested by Block and by Bayne and Chalmers—the subject is access conscious of the contents corresponding to each individual row but not of the conjunctive content corresponding to the entire matrix. The conjunctive content is neither available for verbal report nor as a guide to reasoning or behavior. The Sperling data need not be so interpreted. But as Bayne and Chalmers remark, "it seems to be a perfectly coherent interpretation, one that describes a perfectly reasonable way for a cognitive system to function" (2003, p. 36). I will assume that the suggested interpretation is correct.

Despite the breakdown of access unity, the Sperling case does not seem to involve a corresponding breakdown of phenomenal unity. As Bayne and Chalmers write, "it is plausible that the phenomenology of seeing the matrix will subsume the phenomenology of seeing the individual cells" (2003, p. 36). So, here the access disunity requires an explanation that is consistent with phenomenal unity. Such explanations are available. Indeed, it would not be surprising if human cognitive systems were designed to function in this way. As Bayne and Chalmers observe, "given a natural design for cognitive systems with limited resources, we would expect certain restrictions on the flow of

information in access and control, and we would expect access bottlenecks to arise in some cases" (2003, p. 36). Call this *the bottleneck explanation*.

Split-brain cases might be analyzed along similar lines. On this view, *S* would experience a conjunctive state involving experiences corresponding to 'pen' and 'knife' that subsumes his individual experiences of 'pen' and of 'knife', but he would lack access to a corresponding conjunctive content. I do not suggest that we know the bottleneck explanation to apply to split-brain phenomena. But it is reasonably plausible and no less straightforward than the explanation Tye proposes. Indeed, the Sperling case may have more in common with split-brain cases than blindsight does. The split-brain phenomenon and the Sperling case both appear to involve a breakdown of access unity, whereas blindsight does not appear to involve a breakdown of either access unity or phenomenal unity.

Admittedly, the analogy between the Sperling case and split-brain cases is imperfect, in at least two ways. First, in the case of the split brain, the access disunity is not a by-product of natural cognitive design: it results from neurosurgery. But it is hard to see why this difference would matter. The analogy concerns the nature of the conditions, not their causal origins.

Second, in the Sperling case one is access conscious of the contents corresponding to the top row in the same way as one is access conscious of the contents corresponding to the bottom row. For example, the subject can report both in the same way, and more generally both are available for rational inference in the ordinary way. By contrast, in split-brain cases, the contents associated with the right hemisphere do not appear to be available for spoken report (because the left hemisphere dominates the

control of speech); and, at least under experimental conditions, the contents associated with each hemisphere are only partially available for rational inference, since these contents are not available for rational integration with contents associated with the other hemisphere. This contrast may indicate that the degree of access disunity in split-brain cases is more severe than in the Sperling case.

Still, it is not clear why the severity of access disunity should indicate that the relevant states are phenomenally disunified. The latter conclusion would be justified if no explanation of the severe access disunity were available other than a lack of phenomenal unity. But there is an alternative explanation: the bottleneck explanation. I do not see why bottlenecks could not explain even the sort of severe access disunity that split-brain cases exhibit.

Further, there are other explanations that, like the bottleneck explanation, do not rely on a phenomenal disunity thesis. In recent work, Bayne (2007, n.d.) develops an account of the split-brain that upholds phenomenal unity: the "switch model", on which the disunity exhibited by split-brain patients derives from inter-hemispheric shifts in attention.[6] He argues (in Bayne n.d.) that certain studies from the 1990's (e.g., Pashler, et al.. 1994) suggest a degree of attentional interaction between hemispheres that accords well with the switch model and exceeds that predicted by models that reject phenomenal unity. There do not appear to be similar grounds for applying the switch model to the Sperling case. For our purposes, however, the important point is that, given the limited information presently known, there is a reasonably strong case for believing that the access disunity exhibited by split-brain cases can best be explained in terms that do not

[6] Although the switch model and the bottleneck explanation are distinct, they do not seem incompatible.

require a phenomenal disunity thesis. Tye's suggestion to the contrary might derive from his focusing too narrowly on his comparison to blindsight.[7]

5. Divided subjects

In the preceding section, I criticized Tye's description of what empirically is going on in split-brain cases—his view that, in experimental situations, in split-brain patients there occurs disunified phenomenal consciousness, in addition to disunified access consciousness. Call that view *Tye's empirical analysis*. Now consider *the entailment thesis:*

(ET) Tye's empirical analysis entails that the phenomenal unity thesis is false.

Tye's argument for phenomenal disunity appears to rely on ET. And *prima facie*, ET may seem obvious. After all, if Tye's empirical analysis is correct, then split-brain patients exhibit phenomenal disunity.

Nevertheless, in this section I will argue that ET is false. The basic idea is relatively straightforward. Assume that Tye's empirical analysis is true and thus that there occurs in split-brain patients phenomenal disunity. Even so, this disunity may be

[7] As Bayne and Chalmers note, if split-brain cases do not involve a breakdown of phenomenal unity, then these patients have impaired self-knowledge. For example, *S* will claim that he is experiencing only one word, when in fact he experiences two. But this is not especially surprising. As Bayne and Chalmers write, "it is plausible for many other reasons that knowledge of consciousness is fallible, and it is not unreasonable to suppose that in cases of brain damage, this fallibility might be quite striking" (2003, p. 39). Here it is worth noting that, for all we know, there may be variation in the nature of the mental bifurcation produced by commissurotomy. Perhaps some operations result only in failures of access unity, whereas others have more radical consequences. Callosal agensis patients, who are born without a corpus callosum, do not clearly display the sort of mental bifurcation that commissurotomy patients such as *S* do. See Hurley 2003, pp. 77-81; Jeeves 1965, Milner and Jeeves 1979; and Diamond 1972. In my view, the question of what exactly is going on in split-brain cases remains open. Further studies may help to resolve it, and its resolution will likely depend on the empirical details.

attributable to the existence of two distinct subjects, neither of which has any phenomenally disunified states.[8] And that scenario is compatible with the phenomenal unity thesis. Therefore, Tye's empirical analysis does not entail that the phenomenal unity thesis is false.

To flesh this out, let us begin by looking a bit more closely at the phenomenal unity thesis. The thesis may be expressed as follows:

> (PUT) Necessarily, whenever a subject simultaneously has multiple states of consciousness, there is something it is like for the subject to be in all those states at once.

Bayne and Chalmers explicate PUT in terms of the subsumption relation among phenomenal states. Subsumption may be understood as a sort of mereological part/whole relation. What it is like to have a subsumed state is an aspect of what it is like to have the subsuming state. In terms of subsumption, PUT states that, necessarily, whenever a subject simultaneously has multiple states of consciousness, there is an encompassing phenomenal state that subsumes a subject's individual (non-encompassing) phenomenal states: "the subject's *total* conscious state" (Bayne and Chalmers 2003, p. 27). The total conscious state is not just a conjunctive state consisting of the subject's individual phenomenal states. It is a distinct state of phenomenal consciousness, with its own

[8] The classic source of the dual-subject view is Sperry 1968. The view is defended in Puccetti 1981. Of course, embracing the view would undermine the argument that split-brain patients exhibit access disunity—though there may be other arguments that access unity can breakdown, e.g., from the Sperling case.

phenomenal character. Bayne and Chalmers' explication of PUT is plausible, and I will assume it is correct.[9]

Thus, to refute PUT, one must produce a case in which a subject has, at a given time, individual states of phenomenal consciousness but no corresponding total conscious state. Consider *S*. On Tye's empirical analysis, there are times at which *S* has distinct phenomenal states of phenomenal consciousness without a corresponding total conscious state. Therefore, given Tye's analysis, *S* might seem to constitute exactly the sort of counterexample required to refute PUT.

On reflection, however, this is not so clear. On Tye's empirical analysis, in split-brain patients there occurs disunified phenomenal consciousness, at least sometimes. For example, in experimental situations, *S* is associated with two separate sets of phenomenally conscious states—sets that are separate in the sense that they are not phenomenally unified. It does not follow that either set lacks a total conscious state. Tye's arguments provide no good reason to doubt that for each of the two sets there is a corresponding total conscious state.

This is crucial because it allows the advocate of phenomenal unity to resist Tye's argument by rejecting ET. She can argue as follows. There is no breakdown of phenomenal unity, in the sense of phenomenal unity relevant to PUT. Rather, under experimental conditions, *S* is associated with two subjects, and the states of each are phenomenally unified. So, Tye's empirical analysis does not undermine PUT, at least not by itself. ET is false, and thus Tye's argument for phenomenal disunity fails.

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[9] For more details on the subsumption relation and its connection to what it is like, see Bayne and Chalmers 2003, pp. 40-47. For an alternative explication of PUT, in terms of 'co-consciousness' rather than subsumption, see Dainton 2000. For a comparison between Dainton's approach and Bayne and Chalmers', see Bayne 2001. Versions of PUT arguably go back at least to Descartes and may be found in the work of Leibniz, Kant, and James, to name a few. For a historical overview, see Brook (n.d.).

6. Responses

In this section I will consider five possible responses to the arguments I have presented, most of which concern the argument of the preceding section. Some of the responses raise hard questions but, I will argue, none saves Tye's case for phenomenal disunity.

6.1 First response: ET is the wrong target

Even if ET is false, there may be a threat to PUT in the vicinity. Consider the *single subject thesis*:

> (SST) Split-brain patients are single subjects and thus are not associated with two subjects, even in experimental situations.

Now consider an alternative entailment principle:

> (ET*) The conjunction of Tye's empirical analysis and SST entails that PUT is false.

ET* is plausible. It is not threatened by the argument of section 5. And perhaps it captures the premise Tye intends better than ET does. Thus, one might argue, my objection to ET misses the mark.

However, it is not obvious why SST should be accepted. Tye defends it but, I will argue, his defense is at best incomplete. His defense has two parts. First, he argues that, in normal, non-experimental situations, split-brain patients are single subjects. Second, he extends that claim to experimental situations. Let us examine those arguments.

Regarding the first part of his defense of SST, Tye writes,

> There is a unity, an integrated character to the functioning of split-brain patients outside of certain very special, experimental situations. They…engage in any number of everyday activities in the normal way. In particular, they do not report any breakdown or division in the visual field. How could this be, if split-brain patients are really two different persons? …Those who know split-brain patients cannot help think of them and relate to them as single subjects. (Tye 2004, p. 115)

Here Tye appears to reason as follows:

1. Outside of special experimental situations, split-brain patients function as single subjects.
2. If so then, outside of special experimental situations, split-brain patients are single subjects.
3. Therefore, outside of special experimental situations, split-brain patients are single subjects.

Premise 1 is plausible, for the empirical reasons Tye states in the passage quoted above. And a case can be made for premise 2. In *Consciousness and Persons*, Tye develops a conception of a subject of experience on which that premise is plausible. On his conception, subjects are *bearers of psychological systems*—"person-level psychological framework[s]" (Tye 2004, p. 141) that exhibit overall diachronic functional integration. That conception appears to vindicate premise 2.[10]

However, invoking Tye's conception of subjecthood in the present dialectical context is problematic. Doing so would distort PUT. The idea that phenomenal consciousness is necessarily unified is intuitively plausible, and PUT does a good job of capturing that idea.[11] The thesis is one many philosophers will find plausible, not just at first glance but on reflection (Bayne and Chalmers 2003, p. 24). But if the notion of a subject that it employs were Tye's, then not much reflection would be needed to recognize that the thesis cannot be true. With only a little reflection, one can recognize that there could be creatures that both exhibit the sort of functional integration that Tye describes and are associated with two separate sets of phenomenal states. It is not obvious that split-brain patients are such creatures. But that there *could* be such creatures seems hard to deny. Thus, Tye's conception of a subject is not the one that PUT involves. Therefore, he cannot rely on invoking that conception in defending premise 2.

What conception of a subject does the thesis involve? The most natural candidate is the minimal notion of *a bearer of phenomenal states*. That minimal notion fits well

[10] For a similar conception, which is also developed in connection to split-brain cases, see Marks 1980, esp. pp. 34-35.

[11] PUT's intuitive value will be hard to appreciate if the thesis is confused with other claims in the neighborhood. In particular, the phenomenal unity it concerns should be distinguished from gestalt unity, as in the Mueller-Lyer illusion. In cases of gestalt unity, having a conscious experience of different objects at once produces a novel experience—one that is phenomenally distinct from, and does not simply subsume, the experiences of perceiving the objects separately. See Bayne and Chalmers 2003, p. 27.

with PUT, and it certainly does not undermine PUT's intuitive plausibility. Of course, the notion raises issues about the metaphysics of subjects—questions I will not attempt to resolve. But it is worth noting that divorcing the notion of a subject from the functional conditions that Tye emphasizes does not immediately entail that subjects are nonphysical. The minimal notion is just that: minimal. It appears to leave open a wide range of views about the metaphysics of subjects, including even the reflexive view recently advocated by Galen Strawson (2007), on which experiences are their own subjects.

On the minimal conception, there is no obvious reason why two subjects could not be associated with a single creature that exhibits substantial functional integration over time. So, on the minimal conception, functional integration is not a sure sign of single-subjecthood. Thus, not only are grounds for premise 2 lacking. If we understand PUT as involving the minimal conception of a subject, which is a natural interpretation, premise 2 may well be false.

In a 2005 essay, Bayne briefly mentions a objection to Tye's argument similar to the one I have just presented. He criticizes Tye for equating the notions of a subject and a person in discussing split-brain cases. I am not sure that is the best way to put the point. In this context, the notion of person would seem to raise the same issues as the notion of a subject. However, it might be useful to use the subject/person terminology to mark the different conceptions: *bearer of phenomenal states* versus *bearer of a psychological system*.

In any event, suppose the first part of Tye's defense of SST is correct: outside of special experimental situations, split-brain patients are single subjects. There remains the second part of his defense: his attempt to extend his conclusion to special, experimental

situations. There is an obvious problem for doing so: in such situations, split-brain patients do not exhibit the relevant sort of functional integration. There may be good reasons to extend Tye's conclusion, but it is not clear what these are. And the reasons he provides do not suffice. Let us turn to those reasons.

Tye considers and rejects an argument that SST leads to contradiction. He describes that argument as follows:

> …consider again the split-brain patient who has the word 'pen' flashed on the left of the screen and the word 'knife' on the right. He believes that he saw 'pen'…and he believes that he saw 'knife… Given that he doesn't say 'pen', when asked what he saw, it seems that he doesn't believe that he saw 'pen'. And given that he doesn't reach with his left hand for a knife in the group of objects, it seems that he doesn't believe that he saw 'knife'. One person cannot both believe that *P* and *not* believe that *P* at the same time. So, the split-brain patient is really two persons, albeit for a short period of time. (Tye 2004, pp. 115-16)

Tye raises two objections to that argument. First, he identifies a fallacious inference on which the argument relies:

> The fact that the split-brain patient doesn't say 'pen', when asked what he saw, doesn't show that he *doesn't* believe that he saw 'pen'. He does believe that. It's just, given the commissurotomy, he can't verbally express the belief. (Tye 2004, p. 116)

Second, he notes that although there is evidence that the patient has contradictory beliefs, this is unproblematic and even common:

> But one and the same individual can certainly believe that *P* and believe that not-*P* at the same time. …There are many such examples in everyday life. Consider Jonathan's wanting a Ferrari and his wanting not to have a Ferrari (given the unreliability of Ferraris, the cost, the worries involve, etc.)… (Tye 2004, p. 116)

Tye's objections are reasonable. In my view, they answer the argument that SST leads to contradiction. But he concludes that the thesis that split-brain patients are, in experimental situations, two subjects "is a nonstarter" (Tye 2004, 117), and that conclusion simply does not follow from the failure of the argument that SST leads to contradiction. True, the functional disassociation between the left and right hemispheres that is present in experimental situations does not prove that the dual-subject thesis is correct even as restricted to such situations. Nevertheless, the disassociation provides at least *prima facie* evidence for that thesis. Tye dismisses that thesis too hastily. And if it is defensible, then grounds for SST would appear to be lacking—even if we grant the unproven assumption that SST correctly applies to nonexperimental situations. Thus, unless more support for SST is provided, Tye's empirical analysis fails to undermine PUT.

Further, although I have followed Bayne and Chalmers in formulating PUT in terms of the notion a subject, doing so may be dispensable (Bayne and Chalmers 2003,

pp. 55-57). The thesis could be formulated in terms of the notion of a phenomenal field: necessarily, every phenomenal field is associated with a total phenomenal state the phenomenal character of which subsumes the phenomenal characters of the individual states in the field.

Of course, this raises the question of what phenomenal fields are. To understand the relevant notion of a phenomenal field, begin with the familiar notion of a subject's visual field. More precisely, consider the phenomenal aspects of her visual field. The combination of those with the phenomenal aspects of the states associated with her other sense modalities (hearing, taste, proprioception, etc.) at a given time constitutes a phenomenal field. This way of introducing the phenomenal field involves the notion of a subject. But perhaps it is coherent to regard the mention of subjects as merely part of a reference fixing description, in Kripke's (1972) sense.

The coherence of that position is not at all obvious. It may well be that there is a strong, metaphysical dependence of phenomenal fields on subjects. But suppose this is not so. Suppose, for example, that it is possible to defend the view on which phenomenal fields are metaphysically fundamental and subjects are not. If it is, then the advocate of phenomenal unity would have another response to Tye's defense of SST: she could argue that subject-hood is simply irrelevant to PUT. I do not recommend that strategy. Using the notion of a subject in formulating the thesis has advantages. In particular, doing so is natural and traditional. Even so, for the purposes of assessing challenges to PUT, it is worth bearing mind that it might be possible to set aside issues concerning subjecthood altogether—though again, Tye's defense of SST fails for independent reasons.

6.2 Second response: SST is intuitive just like PUT

One might argue that my defense of PUT is internally inconsistent. I have defended the thesis partly on the ground that it is intuitively plausible. However, my argument depends on rejecting SST and, one might argue, SST is no less intuitive than PUT. Of course, we might elect not to put much stock in intuitions regarding split-brain cases and the unity of consciousness; current understanding of these matters is highly limited. But, the objection runs, that tack is not available to me. To put it another way, I am being unfairly selective in which intuitions I take seriously.

This objection is not compelling. The intuitive plausibility of PUT stands up well to careful reflection. At first, a small amount of reflection might appear to refute it. For example, when first confronted with thought experiments from the personal identity literature such as Derek Parfit's (1984) *My Division*—an imagined case in which he splits amoeba-like into two separate persons, with complete bodies, each of which has a brain hemisphere that functions as a whole brain—one is tempted to reject *any* substantive unity-of-consciousness doctrine. However, more careful reflection on what PUT says reveals that the thesis does not conflict with such thought experiments, at least not obviously. Dividing in two might simply produce two subjects of experience, each of which manifests phenomenal unity.

Split-brain cases present a more serious challenge to PUT, because they involve only one brain and body—a circumstance that, on most views, is ordinarily associated with only one subject of experience.[12] But it is not at all clear that the "one brain-and-body, one subject" thesis is intuitive in the same way that PUT is intuitive. The "one brain-and-body, one subject" thesis is plausible enough for ordinary human beings in

[12] However, see Puccetti 1981.

ordinary circumstances. But its application to people in the extraordinary circumstances that obtain, at least in experimental conditions, after commissurotomy is not so intuitive. On the contrary, a little reflection on how split-brain patients behave in experimental conditions and the "one brain-and-body, one subject" thesis seems doubtful. And more careful reflection on what that thesis says does not seem to remove the doubt. Of course, considerations of simplicity or elegance might favor the thesis. But that is another matter. The thesis it is not intuitive in the way PUT is.

6.3 *Third response: If split-brain cases do not undermine PUT, then PUT is trivial*

If split-brain cases do not undermine PUT, even assuming Tye's empirical analysis, then what could? Is the thesis unfalsifiable? If so, then something has gone awry. This response stems from a reasonable concern. PUT is a substantive thesis that *prima facie* could turn out to be false. So, my arguments had better not render it trivially true.

Fortunately, they do not. PUT is false if (given the Bayne-Chalmers explication) the following conditions hold: there is a (possible or actual) case in which a subject has, at a given time t, multiple experiences—say, experiences A, B, and C—but there is nothing it is like at t for the subject to experience A & B & C, i.e., if she has no total conscious state subsuming A, B, and C. It is not easy to conceive of a case that meets these conditions. Indeed, on reflection such a case may be inconceivable. But the existence of such a case is not ruled out by definition. In particular, such a case is not ruled out by the minimal conception of subject discussed above. In principle, PUT could

be falsified. But it is not at all clear that split-brain cases achieve this, despite Tye's claim that they do.

6.4 Fourth response: PUT entails a transitivity thesis that Tye refutes

Tye (2004, ch. 5.6) claims that phenomenal unity can be nontransitive. Because the subsumption relation is transitive, Tye's claim might seem to undercut PUT, if PUT is understood in terms of that relation. But that inference is mistaken. The nontransitivity Tye has in mind occurs in a case such as the following. *S* has an itch in his neck during the 'pen'/'knife' experiment. The itch is associated with both the left and right hemispheres. It is access unified with both the experience of perceiving 'pen' and the experience of perceiving 'knife'. And, as Tye would describe the case, the itch is phenomenally unified with the experience of perceiving 'pen' and with the experience of perceiving 'knife', but the latter two experiences are not phenomenally unified.

However, that case is consistent with PUT, because it does not indicate a failure of *subsumptive* transitivity. Subsumptive transitivity says: if phenomenal state A subsumes phenomenal state B and B subsumes phenomenal state C, then A subsumes C. A failure of subsumptive transitivity would therefore be a case in which, although A subsumes B and B subsumes C, A does not subsume C. Tye's case, involving the itch, is plainly not such a case. Therefore, the case does indicate that access unity is not transitive. But as we have seen, that is another matter.

6.5 Fifth Response: PUT conflicts with Tye's experiential monism

In chapter 4 of *Consciousness and Persons*, Tye argues for the following view:

> Consciousness forms a stream. …A stream of consciousness is just one temporally extended experience that represents a flow of things in the world. It has no shorter experiences as parts. Indeed it has no experiences as proper parts at all. (Tye 2004, p. 108)

Call that view *experiential monism.* Experiential monism might seem to conflict with PUT, for the following reason: PUT concerns a subject's having multiple states of consciousness at a given time, and experiential monism seems to imply that subjects have no such states but only single, temporally extended streams. The conflict might seem especially acute given that I have followed Bayne and Chalmers in explicating PUT in terms of subsumption, which implies that individual conscious states bear something like a part-whole relation to total states.

I have three replies. First, if experiential monism and PUT conflict, it is not obvious which thesis to reject. Here is not the place to explain why I find Tye's arguments for experiential monism unpersuasive, but I will mention that the doctrine is neither widely accepted nor, in my view, terribly intuitive. Second, PUT does not entail that subjects do in fact have multiple states of consciousness at a given time. It says only that *if* such states occur, then there is something it is like for the subject to have all of them at once. So, strictly speaking, there is no conflict. Third, PUT can be recast in terms more consonant with experiential monism. Even if single, temporally extended streams of phenomenal consciousness lack experiences as parts, such streams presumably have

various phenomenal *aspects*. A monistic version of PUT would simply replace references to multiple experiences with references to multiple aspects:

> (PUT_{EM}) Necessarily, whenever a subject has a stream that has multiple phenomenal aspects at a given time, there is something it is like for the subject to have a stream with all those aspects at once.

Even if experiential monism conflicts with PUT, it does not conflict with PUT_{EM}. And what I have said in defense of PUT holds *mutatis mutandis* for PUT_{EM}.

7. Conclusions

I have two main conclusions. First, the available empirical data do not provide anything like conclusive support for Tye's view that, under experimental conditions, split-brain patients have divided phenomenal fields. The data provide as much or more support for views on which only access consciousness divides. Second, Tye's empirical analysis, on which in experimental situations split-brain cases exhibit phenomenal disunity, is compatible with PUT—as long as SST is rejected. Additionally, I have argued that the advocate of PUT can reject SST plausibly and without inconsistency; that PUT is not trivialized by my defense of it; that PUT does not entail a transitivity thesis that Tye refutes; and that there is at most superficial tension between PUT and Tye's experiential monism.

Thus, it would be a mistake to reject PUT on the basis of Tye's arguments. PUT should not be lighted dismissed. As Bayne and Chalmers (2003, p. 55) remark, there

seems to be something inconceivable in the idea of a true breakdown of phenomenal unity—in the idea of a subject's having, at a time, multiple phenomenal states that are not subsumed by a total conscious state. It might turn out that the subsumption relation does not hold in the systematic way that PUT states. But how this can be is at least hard to fathom.[13]

References

Bayne, T. n.d. The unity of consciousness and the commissurotomy syndrome. Macquarie University ms.

Bayne, T. 2007. Conscious states and conscious creatures: explanation in the scientific study of consciousness. *Philosophical Perspectives 21: Philosophy of Mind*. Ed. J. Hawthorne. Oxford: Blackwell: 1-22.

Bayne, T. 2005. Divided brains and unified phenomenology: an essay on Michael Tye's *Consciousness and Persons. Philosophical Psychology* 18: 495-512.

Bayne, T., and Chalmers, D. J. 2003. What is the unity of consciousness? In A. Cleeremans (ed.), *The Unity of Consciousness: Binding, Integration, Dissociation*. New York: Oxford University Press.

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Bayne, T. 2001. Co-consciousness: review of Barry Dainton's *Stream of Consciousness*. *Journal of Consciousness Studies* 8: 79-92.

Block, N. 1995. On a confusion about a function of consciousness. *Behavioral and Brain Sciences* 18: 227-47.

Brook, A. n.d. The unity of consciousness. In *The Stanford Encyclopedia of Philosophy: http://plato.stanford.edu/entries/consciousness-unity*.

Chalmers, D. J. 1996. *The Conscious Mind: In Search of a Fundamental Theory*. New York: Oxford University Press.

Dainton, B. 2000. *Stream of Consciousness: Unity and Continuity in Conscious Experience*. New York: Routledge.

Dennett, D. C. 2005. *Sweet Dreams*. Cambridge, MA: MIT Press.

Diamond, S. 1972. *The Double Brain.* London: Churchill Livingsone.

Hurley, S. 2003. Action and the unity of consciousness, and vehicle externalism. In A. Cleeremans (ed.), *The Unity of Consciousness: Binding, Integration, Dissociation*. New York: Oxford University Press: 78-91.

Jeeves, M. 1965. Agenesis of the corpus callosum—physiopathological and clinical aspects. *Proceedings of the Australian Association of Neurologists* 3: 41-8.

Kripke, S. 1972. Naming and necessity. In G. Harman and D. Davidson (eds.) *The Semantics of Natural Language*. Dordrecht: Reidel. Reprinted as *Naming and Necessity*. Cambridge, MA: Harvard University Press, 1980.

Marks, C. E. 1980. *Commisurotomy Consciousness & Unity of Mind*. Vermont: Bradford Books. Second printing 1981, Cambridge, MA: MIT Press.

Milner, A., and Jeeves, M. 1979. A review of behavioural studies of agenesis of the corpus callosum. In Russell, I., Van Ho, M., and Berlucchi, G. (eds), *Structure and Function of Cerebral Commissures*. London: Macmillan Press: 428-83.

Pashler, H., Luck, S. J., Hillyard, S. A., Mangun, G. R., O'Brien, S., and Gazzaniga, M. S. 1994. Sequential operation of disconnected cerebral hemispheres in split-brain patients. *NeuroReport* 5, 2381-2384.

Parfit, D. 1984. *Reasons and Persons*. New York: Oxford University Press.

Puccetti, R. 1981. The case for mental duality: evidence from split-brain data and other considerations. *Behavioral and Brain Sciences* 4: 93-123.

Robinson, W. S. 1982. Causation, sensations and knowledge. *Mind* 91, 524-40.

Sperling, G. 1960. The information available in brief visual presentations. *Psychological Monographs* 498:1-29.

Sperry, R. 1968. Hemisphere deconnection and unity in conscious awareness. *American Psychologist* 23: 723-33.

Strawon, G. 2007. Realistic monism: why physicalism entails panpsychism. In A. Freeman (ed.), *Consciousness and Its Place in Nature: Does Physicalism Entail Panpsychism?* Exeter: Imprint Academic, pp. 3-31.

Tye, M. 2004. *Consciousness and Persons: Unity and Identity.* Cambridge, MA: MIT Press.

Weiskrantz, L. 1986. *Blindsight: A Case Study and Its Implications.* New York: Oxford University Press.