

Counting Minds and Mental States

A number of people have undergone surgery which severed the principal connection between the left and right hemispheres of their brains. Their subsequent behavior raises puzzles about what their mental lives are like. These puzzles lead to broader questions about the metaphysics of experience and the structure of consciousness itself.¹

Let's suppose that, ordinarily, the mental life of a human being comprises one unified "stream of consciousness". The elements of that stream are individual experience tokens with various contents. To fix terminology, experience tokens e and e' are *unified* just in case they belong to the same stream. Another important relation between experiences is *co-consciousness*. To try to be as neutral as possible, we can say that e and e' are co-conscious just in case they are "experienced together".² A straightforward proposal is that experiences are unified just in case they are co-conscious.³

Experiments with split-brain subjects indicate that their mental lives are significantly altered by their surgery. While, for the most part, their conscious experience appears to be normal, there are some striking exceptions. A tactile experience via a subject's left hand, α , may be divorced from a visual experience via his right eye, γ . Both experiences seem to occur without being co-conscious. There is a further complication. It could be that, at the same time, a siren goes off and the subject is bound to hear it. In that case, α will be co-conscious with an auditory experience of the siren, β , and so will γ . How should we describe the split-brain subject in these circumstances? Does he have one stream of consciousness, or two? And how many experiences of the siren does he have?

Schechter discusses two competing accounts of the split-brain subject's mental life. On the *partial unity model*, the split-brain subject has a single stream of consciousness, albeit one that exhibits a marked level of dissociation. The experiences α , β , and γ are unified, even though not all of α , β , and γ are co-conscious (α and γ aren't).⁴

The alternative to PUM is the *conscious duality model*, according to which the subject hosts two distinct streams of consciousness, each primarily supported by one hemisphere of the subject's brain. CDM draws support from the principle that co-consciousness is transitive ("transitivity", for short). That is, if a token experience e is co-conscious with a token experience e' , and e' is co-conscious with a token experience e'' , then e is co-conscious with e'' . The thought, roughly, is that if e is experienced together with e' , and e' is experienced together with e'' , then e has to be experienced together with e'' .⁵ According to PUM, there is a single stream of experience which includes (token) experiences α , β , and γ . α is co-conscious with β , and β is co-conscious with γ . If transitivity holds, α must be co-conscious with γ , which isn't the case. So, PUM is incompatible with transitivity. CDM is able to reconcile transitivity with the experimental finding that α and γ aren't co-conscious. To do that, CDM posits the existence of two distinct token experiences with the same content, β_1 and β_2 . β_1 belongs to one stream of consciousness S1, which contains the members of the set $\{\alpha, \beta_1, \dots\}$. β_2 belongs to a different stream of consciousness S2, which contains the members of the set $\{\beta_2, \gamma, \dots\}$. Within S1, α is co-conscious with β_1 and, within S2, β_2 is co-conscious with γ . Under these circumstances, transitivity doesn't require α and γ to be co-conscious. So, transitivity is consistent with CDM.

Because of the difference between PUM and CDM in this regard, a commitment to transitivity favors CDM.

PUM faces an important criticism due to Susan Hurley. PUM may be taken as a negative thesis, denying that co-consciousness is necessary for unity. But then the advocate of PUM owes us a positive account of unity, and Hurley thinks that there can be no satisfactory account of that sort: “No objective factors can be identified that would make for partial unity. (Thus) there is a fundamental indeterminacy in the conception of what partial unity would be, were it to exist.” (1998: 175). To meet the objection, PUM has to be filled out so that it is unproblematic whether there is a unified stream of consciousness, or not.⁶

Schechter undertakes to do just that. She entertains a trio of claims:

CLAIM I: “Any content that is available to the full suite of conscious control systems within an organism is carried by only a single vehicle.” (MS: 15)

CLAIM II: “For a given content B, there are as many vehicles carrying B as there are ‘functional sets’ of conscious control systems to which that content is made available.” (MS: 14).

“Functional set” may be glossed this way:

CLAIM III: “What makes a collection of control systems constitute a functional set, meanwhile, is that they have access to most or all of the same contents.”⁷ (MS: 14).

Let’s return to the example discussed above, in which the contents α and β are available to one hemisphere and the contents β and γ are available to the other. Suppose further that there are only two “conscious control systems” C1 and C2, each based in one hemisphere. Both C1 and C2 have access to the content β . Thus, by Claim I, there is only one token experience with the content β . This result is inconsistent with CDM, so it points us in the direction of PUM.

The trouble is that Claims II and III are inconsistent with Claim I. Suppose again that there are two conscious control systems C1 and C2, each associated with a different hemisphere. Now imagine that the contents available to these systems are very different, though not entirely so. For example:

C1 has access to $\alpha, \beta, \gamma, \delta$.

and

C2 has access to $\delta, \epsilon, \zeta, \eta$.

All control systems have access to the content δ , so by Claim I:

- (1) There is only one token experience with the content δ .

However, the contents available to C1 and C2 are generally very different. So according to Claim III:

(2) C1 and C2 don't constitute one functional set.

From (2) and the description of the case:

(3) More than one functional set has access to the content δ .

From (3) and Claim II:

(4) There is more than one than one token experience with the content δ .

(1) and (4) are contradictory.

The opponent of CDM will want to avoid this outcome, and Schecter suggests another line to take:

CLAIM IV: "At any moment in time, an animal cannot have multiple experiences with the same content." (MS: 15).⁸

Claim IV is a much stronger version of Claim I, and Claim IV by itself is sufficient to rule out CDM. But, as it stands, Claim IV looks like little more than a stipulation that CDM is wrong.⁹ And there is worse. Consider the animal described in this passage: "Pushmi-pullyus are now extinct. That means, there aren't any more...They had no tail, but a head at each end, and sharp horns on each head."¹⁰ Now suppose a lion roars, which both heads of the pushmi-pullyu hear. It seems that both heads will have auditory experiences of the same type. That is, there will be an animal that has multiple experiences with the same content, contrary to Claim IV.¹¹

Various defensive maneuvers are possible, of course. That the pushmi-pullyu has two completely disconnected brains is an excellent reason to suppose that it has two token experiences with the same content. We might build that in as a permitted exception to Claim IV. But what if the pushmi-pullyu's nervous system were somewhat different, so that its brains shared a common part? If activity in that common part makes no difference to conscious experience, then it seems we should still say that the pushmi-pullyu is host to two experience tokens with identical contents. A further exception to Claim IV is necessary. Where do the exceptions stop? To settle the issue, the opponent of CDM must come up with a refined neural or functional criterion for determining how many token experiences there are in a given instance. But in that case Claim IV and its successors would no work.

There is one more possibility to take up. According to PUM, experiences can be unified even though they aren't co-conscious. There is, however, the *ancestral* of the co-consciousness relation, call it "co-consciousness*". E1 and En are co-conscious* just in case E1 and En are co-conscious; or E1 and E2 are co-conscious and E2 and En are co-conscious; or.... A way to spell

out PUM is to say that two experiences are unified just in case they are co-conscious*.¹² This proposal allows us to say that, in the example above, (token) experiences α , β , and γ make up one stream of consciousness, even though α and γ aren't co-conscious. And, it seems, PUM so understood would bring with it no more indeterminacy than CDM does. Apparently, both will be as determinate as the co-consciousness relation is.

I have to say that I am suspicious of this version of PUM. For one thing, it seems ad hoc. For another, it is extremely permissive. Two experiences e and e' could count as unified despite their being, in an important sense, quite isolated from one another. PUM allows them to be separated by indefinitely many links of co-consciousness between other experiences. Thus, the proponent of PUM might need to set some limit to how etiolated the link between unified experiences can possibly be. But, then, how many removes are too many? Why set the boundary exactly there? These questions don't seem to have good answers. To this extent, PUM will introduce a further level of indeterminacy about the number and identity of streams of consciousness, as Hurley had feared.

There is an additional difficulty. For the sake of argument, let's suppose that the maximum number of links between two elements of a stream is 3. And imagine that, as things actually are, there is a stream with the following structure (“^” stands for co-consciousness):

$$\alpha \wedge \gamma \wedge \delta \wedge \varepsilon$$

It is to be understood that there are no relations of co-consciousness besides those explicitly indicated. For example, α and δ aren't co-conscious. Now, our subject could have had another experience β , which was co-conscious with α and γ , while all the other relations of co-consciousness remained in place. Thus:

$$\alpha \wedge \beta \wedge \gamma \wedge \delta \wedge \varepsilon$$

But by hypothesis this four-link chain can't be a single stream of consciousness. If the facts about co-consciousness are to be respected, there will have to be two streams, involving a duplication of some content or other. This itself is bad news for PUM, if the model is committed to avoiding such duplication. One possibility “(2 + 2)” is:

$$\alpha \wedge \beta \wedge \gamma_1 \quad \gamma_2 \wedge \delta \wedge \varepsilon$$

Another “(1 + 3)” is:

$$\alpha \wedge \beta_1 \quad \beta_2 \wedge \gamma \wedge \delta \wedge \varepsilon$$

A host of unwelcome questions arise. What would make it the case that the resulting two streams were (2 + 2) rather than (1 + 3), or vice-versa? Both possibilities respect the facts about co-consciousness (with respect to contents). Note that this sort of problem, and potential for indeterminacy, won't come up for CDM. Given the facts about co-consciousness as stated, and the assumption of transitivity, the only possibility is:

$$\alpha \wedge \beta \quad \beta \wedge \gamma \quad \gamma \wedge \delta \quad \delta \wedge \varepsilon$$

Let's return to PUM. Suppose that there is a fact of the matter about whether (2 + 2) or (1 + 3) would be the case if the subject were to have a further experience β . γ actually exists. If experiencing β brought about (2 + 2), would γ be identical to γ_1 or to γ_2 ? Neither answer seems right. Should we say, "If γ had been co-conscious with another experience β , γ wouldn't have existed"? That sounds at least as bad.¹³ The problem here is worse than the one encountered in describing ordinary fission cases, like the fate of an ameba that divides. The prospect in this instance is that the existence of γ could depend on whether the subject happens to have an additional experience with the content β , which seems like a wholly extraneous consideration. The difficulty this variant of PUM faces is more like the problem of the Ship of Theseus. In that notorious example, whether the original ship is identical to the repaired ship seems to depend upon whether discarded planks are reassembled--which is a highly unintuitive outcome, at best.¹⁴ CDM avoids all this trouble, and that is a reason to prefer CDM to PUM in its latest form.

Schechter gives us an imaginative and spirited defense of PUM. But despite her efforts, there are still considerable reasons to worry about the cogency of PUM and to prefer CDM. Going beyond what we ought to say about split-brain cases in particular, we see that transitivity is an appealing principle about consciousness and that allowing the possibility of token experiences with the same content may be inevitable.

Bibliography

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1. My thoughts on these topics took shape as reflections on Elizabeth Schechter's "Partial Unity of Consciousness: A Preliminary Defense" (this volume), and I'll present them in that form. See Schechter's paper for details about the split-brain experiments and about competing models of the conscious lives of the subjects of the experiments.
 2. As Schechter notes, the nature of co-consciousness is a delicate matter. Her preferred formulation is that two experiences are co-conscious insofar as they are "co-phenomenal" (MS: 3, 8).
 3. Schechter rejects this equivalence; see below.
 4. Schechter distinguishes PUM from the *unity model*, according to which the split-brain subject's experiences are all co-conscious. (MS: 3).
 5. See Dainton (2004) for a prominent defense of transitivity.
 6. The proponent of PUM may think that some cases are genuinely indeterminate, and a virtue of PUM is that the model can respect that. See Schechter (MS: 5). Even so, very many cases ought not to count as indeterminate, so the advocate of PUM has work to do.
 7. Presumably, some kind of maximality condition has to be added to avoid an unwanted multiplication of functional sets.
 8. Schechter goes so far as to say "Where there is no qualitative difference between contents, the PUM posits no numerically distinct experiences." (MS: 7). Apart from its own merits or lack thereof, this claim may not sit well with some of Schechter's other commitments; see Note 12.
 9. Schechter writes: "If the PUM comes with no analogous constraint or principle of individuation, then the most a proponent of the PUM can do is simply stipulate that a subject has a partially unified consciousness. Such stipulation would of course leave worries about metaphysical indeterminacy intact; the PUM would thus be uniquely vulnerable to the indeterminacy challenge." (MS: 15).
 10. Lofting (2004), p. 35.
 11. Incidentally, examples like the pushmi-pullyu create trouble for the doctrine of animalism which is prominent in the personal identity literature. See Campbell and McMahan (2010).
 12. In fact, Schechter herself seems to endorse a position of this sort: "The PUM drops the transitivity assumption, allowing that a single experience may be co-conscious with others which are not co-conscious with each other. Streams of co-consciousness may still be structured by co-consciousness, but it is not necessary that every experience within a stream be co-conscious with every other." (MS: 4). However, this view is perfectly consistent with the existence of distinct token experiences with the same contents.

13. David Lewis's counterpart theory might allow us to maintain that γ could have been both γ_1 and γ_2 . See Lewis, "Counterparts of Persons and Their Bodies". Whether we ought to say that, and whether it is helpful to PUM is another matter.

14. See Rea (1995).