

## MELLOR AND DENNETT ON THE PERCEPTION OF TEMPORAL ORDER

BY REBECCA ROACHE

How do we determine precedence? More specifically, what part of our experience facilitates our assessment of the temporal order of perceived events? I shall be looking here at the account offered by Mellor, who argues that since there is no one sensation peculiar to the perception of precedence, it must therefore be the actual temporal order of the *perceptions* of two events which allows us to represent the temporal order of the events perceived. I shall defend this account against criticism by Dennett, who claims that it is the *content* of our perceptions, rather than their timing, which primarily allows us to determine the temporal order of the perceived events. I shall argue that the two accounts are compatible.

### I. MELLOR'S PROPOSAL

In *Real Time*, Mellor raises the question of how we perceive the direction of time.<sup>1</sup> He examines our notion of precedence, and asks where our concepts of 'earlier' and 'later' come from. He argues that our perception of precedence is unlike that of colour, for example, first, because there appears to be some kind of necessity involved in the temporal order of events which is not found in the colour of objects. He says (p. 143) that the sensation of

seeing something white could come from things of any kind.... The laws which say that chalk is white and carbon black could [conceivably] have been false.... So if seeing precedence were a matter of having peculiar – in this case peculiarly temporal –

<sup>1</sup> D.H. Mellor, *Real Time* (Cambridge UP, 1985), hereafter *RT*.

sensations, the laws which say that events precede their perceptions and actions their consequences could likewise have been generally false. We should be able to conceive those sensations of temporal order occurring generally the other way round. Yet we can clearly conceive no such thing.

Further, Mellor points out that the relation of precedence is not phenomenal, in the way in which colours are phenomenal properties: because the relations of 'earlier' and 'later' always occur together, we cannot distinguish the one from the other with recourse to any sensations that arise from their instances, in the way we distinguish different colours. The difference between 'earlier' and 'later', then, 'lies in the *relata*, not in the relation' (*ibid.*): we do not derive our concept of temporal order from the *relation* of precedence. Instead (p. 144),

When I see  $e$  precede  $e^*$ , the only sensations I need have are those that reveal to me the two events themselves. What makes me see them to be in that order is not another sensation, but simply that I see them in that order.

Therefore, according to Mellor (*ibid.*), our representation of the temporal order of two events arises from the temporal order of our experiences of those events. This makes our representation of temporal order unique in that

Perceptions do not usually share the features they are perceptions of... There need be nothing thermal about feeling heat, nothing coloured in colour vision, and nothing (relevantly) spatial about perceiving spatial relations... But perceiving temporal order does demand a corresponding temporal ordering of perceptions.

This requirement for temporal order is linked to causation: in order to see that  $e$  precedes  $e^*$ , 'my seeing  $e^*$  must include something like a memory-trace of my seeing  $e$ ' (*ibid.*), in order to 'make those perceptions part of a causal mechanism which thereby constitutes a whole event, namely my seeing  $e$  precede  $e^*$ ' (p. 145). Further, 'if the causal link runs the other way, I will see  $e^*$  precede  $e$ ' (p. 150). Therefore the causal relations between our perceptions of two events will determine our perception of their temporal order.

## II. DENNETT'S POSSIBLE COUNTER-EXAMPLES

Dennett claims, in *Consciousness Explained*, that it is not the actual order of the perceptions which is important in our assessing their temporal order, but their content.<sup>2</sup> He agrees with Mellor only to a limited degree:

Consider how we distinguish a spot moving from right to left from a spot moving from left to right on a motion picture screen. The only difference between the two may be the temporal order in which two frames (or more) are projected.... The only difference in the stimuli that the brain could use to make this discrimination of direction is the order in which they occur. This discrimination is, then, as a matter of logic,

<sup>2</sup> D.C. Dennett, *Consciousness Explained* (Harmondsworth: Penguin, 1991), hereafter *CE*.

based on the brain's capacity to make a temporal order discrimination of a particular acuity (*CE* pp. 149–50).

This case illustrates the only way in which Dennett allows that the timing of representations determines the order which we perceive them to have: this is because in such a case the timing matters to the content of a perception.

However, he also cites some examples of psychological experiments whose results seem to demonstrate that the order of perceptions does *not* necessarily determine the order that we experience them as having. One such experiment is Benjamin Libet's case of 'backwards referral in time' (*CE* pp. 153ff.; it ought to be mentioned that Dennett also comments that Libet's results are controversial, not having been replicated). In this experiment, a patient's left hand is stimulated at the same time as the area in the brain responsible for sensation in the right hand is stimulated, with the surprising result that the patient reports the tingle in the left hand as having been experienced *before* the tingle in the right hand. Since the signal produced by the stimulation to the left hand must be conducted through neurones between the hand and the brain before any sensation is felt, it must actually have been felt *after* the tingle in the right hand, as this was produced by direct stimulation to the brain, and so had less distance to travel. Therefore, since the patient's representation of the temporal order of the perceptions differs from their actual order, Libet's experiment seems to have produced evidence that Mellor's claim must be false.

Another case discussed by Dennett (p. 167) where the perceived order of events appears to differ from the order of the perceptions of the events is Grey Walter's 'precognitive carousel', where a patient whose brain has been implanted with an electrode is invited to look at pictures on slides:

The patient could advance the carousel at will, by pressing the button on the controller.... Unbeknownst to the patient, however, the controller button was a dummy, not attached to the slide projector at all! What actually advanced the slides was the amplified signal from the electrode implanted in the patient's motor cortex.... They reported that just as they were 'about to' push the button, but before they had actually decided to do so, the projector would advance the slide – and they would find themselves pressing the button with the worry that it would advance the slide twice!

The patient's pressing of the button actually occurs before the carousel advances, but because the brain is expecting 'visual feedback on the successful execution of its project of advancing the carousel, and the feedback arrives earlier than expected', an alarm is triggered, which '*eventually* gets interpreted in the subjective sequence as a perception of misordered events (change before button-push)' (pp. 167–8). This is therefore an example of the *content* of the perceptions affecting the perceived order of events: in trying to make sense of its perceptions, the misordered account of events 'is a natural interpretation for the brain to settle on ... of the various contents made available at various times for incorporation into the narrative' (p. 168). More specifically, assuming that the carousel had advanced before the button was pushed best explains why the subjects felt afraid that they might have advanced the slide twice. For this reason, Dennett (p. 149) claims that

What matters for the brain is not necessarily when individual representing events happen in various parts of the brain ... but their *temporal content*. That is, what matters is that the brain can proceed to control events ‘under the assumption that *A* happened before *B*’ whether or not the information that *A* has happened enters the relevant system of the brain and gets recognized as such before or after the information that *B* has happened.

### III. MELLOR’S THESIS DISPROVED?

Mellor’s reply to Dennett’s account of these special cases is that ‘the causal structure of this perception will be more complex’ than the cases he describes: his claim is that ‘if we see time order *in the way I have described*, the time order we see will be the causal order of the perceptions we see it by’.<sup>3</sup>

However, although this is true, I wish to suggest that Mellor’s thesis can support a stronger claim, namely, that Dennett’s account of the perception of temporal order presupposes Mellor’s.

Let us first examine Libet’s experiment, which appears to be a case where the temporal order of the perceptions of events differs from the perceived order of the events. ‘Perception’ here is used rather loosely: the *actual* timing of the perceptions (that is, the neural signals produced by sensory stimulation reaching the brain) is based on the fact that the signal produced by stimulation to the hand *must* reach the brain after the signal produced by stimulation to the brain itself, because it has further to travel. ‘Perception’ in this sense therefore includes information processed by the brain prior to the patient’s conscious awareness of it. It is possible for us to be mistaken about this sort of perception, because we do not become consciously aware of every piece of information that is processed by our brains, and there will therefore be facts about the brain’s processing of this information which we shall never know. Where necessary, I shall refer to such perception as ‘perception<sub>1</sub>’. What we can take to be the *perceived order* of events as experienced by patients is based on their reports, and so talk of perception in this sense refers only to information which is available for conscious reflection, either as it is received or as it is remembered afterwards. I shall refer to this sort of perception as ‘perception<sub>2</sub>’. Since Mellor is concerned with how we become aware of the direction of time, and therefore with the formation of concepts, he will only be concerned with perceptions in the second sense, that is, those which are accessible to consciousness and reasoning. Concepts such as temporal concepts, which are concerned with the objects of perception, require us to draw on our experience in order to form them: to believe that *e* preceded *e\**, we

<sup>3</sup> Mellor, *The Facts of Causation* (London: Routledge, 1995), hereafter *FC*, at p. 240. The reader may note that I make reference to both *Real Time* and *The Facts of Causation*, which were written ten years apart, and may object that I am therefore not entitled to assume that Mellor holds the same views in each account. However, Mellor, in correspondence, has commented ‘there are several views in *Real Time* I no longer hold ... but it doesn’t make much odds to his arguments, and especially not to those about how we perceive temporal order’.

must at least be aware of  $e$  and  $e^*$ . Further, whether we are mistaken about the actual order of events is irrelevant, since we may base our concepts on inaccurate evidence. For this reason, Mellor says ‘by “perception” ... I shall include misperception: perceptions need not be true’ (*FC* p. 238). That there is a neurophysiological fact about the actual order of the perceptions<sub>1</sub> is therefore a red herring from Mellor’s point of view: all his account requires is that the events are *consciously* experienced in the order that the patient reports them to have occurred. We shall return to this point later.

From the point of view of Mellor’s account, therefore, Libet’s experiment raises an interesting point about psychology, but it does not discredit Mellor’s thesis.

Grey Walter’s precognitive carousel points to the conclusion that in making sense of perceptual information, which includes assessing the temporal order of perceived events, the content of our perceptions is more important than their actual temporal order. It could even be argued that the actual temporal order only *appears* to determine the perceived order because it usually coincides with the most useful or sensible order with respect to content, that is, a causal order which best explains our behaviour.

The first point to consider in reply to this is that Mellor concedes that we may infer the actual events’ temporal order from their content, but (*FC* p. 238) he distinguishes this from misperceiving their order:

suppose that Bill, an astronomer, sees a solar flare occur,  $Q'$ , just after hearing a clock strike one,  $Q$ . He knows that, as it takes longer for light to come from the sun than for sound to come from the clock,  $Q'$  actually precedes  $Q$ . So he does not believe what his senses tell him, namely that  $Q$  precedes  $Q'$ . But they still do tell him this. There is an obvious sense in which Bill perceives this without believing it, the sense in which I see without believing that a conjurer’s rabbit comes out of an empty hat.

If, as has been suggested above, we concentrate only on conscious perceptions, perceptions<sub>2</sub>, when looking at Mellor’s argument, it should not be problematic that in Bill’s case the misordering of events happens before he perceives<sub>1</sub> them; whereas in the case of Grey Walter’s patient the misordering occurs after perception<sub>1</sub> and before perception<sub>2</sub>. The important point to note is that in each case what the subject perceives<sub>2</sub> is not the actual order of events. This illustrates the point that where the actual order of events differs from their order as we perceive<sub>2</sub> it, there is another, causal, story to be told which explains the real order of the events and our (mis)perception of their order, without discrediting the fact that we *did* misperceive their order.

The second point to note is that inferring the temporal order of events, rightly or wrongly, by looking at the content of our perceptions of those events relies on our inferring their causal order. For example, in the case of the precognitive carousel, the carousel was seen to have advanced before the button had been pushed because the carousel’s having already advanced would have causally explained why the patient felt that pushing the button would advance it twice. But this presupposes a concept of temporal order, for merely determining the causal order ‘will not explain why causes precede their effects’ (*FC* p. 237). Therefore Mellor can agree with

Dennett that we may use the content of our perceptions<sub>1</sub> to infer the actual order of the events, and the results of Grey Walter's experiment are consistent with Mellor's account, since the experiment says nothing about how we arrive at a concept of the direction of time.

Let us now return to the distinction made above between two different senses of 'perception'. This distinction may not be as straightforward as it seems. Dennett rejects the idea that conscious experience takes the form of a 'Cartesian Theatre' where conscious experiences are acted out in front of an audience consisting of the subject of those experiences. Instead, he proposes a 'multiple drafts' model of consciousness, where 'Information entering the nervous system is under continuous "editorial revision"' (CE p. 111). This account highlights the possibility that although

Every event in your brain has a definite spatio-temporal location ... asking 'Exactly when do *you* become conscious of the stimulus?' assumes that some one of these events is, or amounts to, your becoming conscious of the stimulus.... Since cognition and control – and hence consciousness – is distributed around [*sic*] in the brain, no moment can count as the precise moment at which each conscious event happens (CE pp. 168–9).

Therefore there may be no fact of the matter about the actual order of the perceptions<sub>2</sub> in certain cases such as those discussed above. Dennett (CE p. 168) concedes that a thesis such as Mellor's

is true in general, and does indeed seem unexceptioned so long as we restrict our attention to psychological phenomena of 'ordinary', macroscopic duration. But the experiments we looked at are concerned with events that were constricted by unusually narrow time frames of a few hundred milliseconds. At this scale, the standard presumption breaks down.

What consequences does this have for Mellor's account?

#### IV. TEMPORAL ORDER IN CONSCIOUS EXPERIENCE

As we have seen, these special cases show nothing about whence we get our concept of precedence. Dennett claims that it is the '*temporal content*' of our representations that is important to our perception of temporal order, and so we must conclude that inferred temporal order must be based on a previously held concept. At most, as in the precognitive carousel, the special cases demonstrate the importance of the perceived<sub>1</sub> causal order of the content of our perceptions<sub>1</sub> in determining the perceived<sub>2</sub> temporal order: and this, as we have seen, does not itself furnish us with a concept of temporal order.

In order for us to arrive at a concept of precedence, says Mellor, our actual perceptions<sub>2</sub> must be causally linked in some way. As we have already seen, this link takes the form of memory, which Mellor takes to be something that allows 'a perception [to] cause its content to be embodied at another time in another state of mind' (FC p. 240). In order to see that  $Q_1$  precedes  $Q_2$ , our perception<sub>2</sub> of  $Q_1$  must be

‘embodied’ in our perception<sub>2</sub> of *Q*: ‘for obviously, if Bill’s perception of *Q* had affected his perception of *Q* and not *vice versa*, he would have perceived that *Q* [precedes] *Q* (*ibid.*). This sounds correct. We are not aware of future perceptions<sub>2</sub> whilst having present ones, and it is difficult to imagine how we could make sense of the world, or what sort of concept of time we would have, if we were. It seems plausible to suppose that we see our intentions as preceding our actions, and their consequences as occurring afterwards, because we are aware of the intentions, but unaware of perceptions<sub>2</sub> of the consequences, whilst performing the actions.

Further, even if, in certain special cases, there is no fact of the matter about the order in which neural signals from sensory stimulation reach consciousness, the fact that the subject reports the events as having occurred in a certain order seems to imply that they (mis)remember having perceived<sub>2</sub> them in that order: Grey Walter’s patient presumably claims to remember perceiving<sub>2</sub> the carousel advance and then perceiving<sub>3</sub> pressing the button. It therefore looks as though, in order to have any perceived<sub>2</sub> order of the events, the subject must work under the assumption that they were in fact perceived<sub>2</sub> in that order. The special cases are only known to be special when we consult information that is unavailable to the subject whilst experiencing the events: the fact that they are special cases does not alter the subjective experience of temporal order.

This raises the point that, given that we restrict our definition of ‘perception’ to perception<sub>2</sub> – that is, to information to which we have conscious access – it would be contradictory to assert that the order of perceptions may differ from the perceived order. To suggest that their order differs from that which we perceive them to have risks an equivocation on the meaning of ‘perception’, for it implies that the perceptions have an order of which we are not conscious: and this, on the present way of construing ‘perception’, is incoherent. Further, even if Dennett’s ‘multiple drafts’ model of consciousness is correct and the perceived<sub>1</sub> order of events is open to revision (as in Grey Walter’s experiment), it seems that if we are to continue to use ‘perception’ in the strict sense (that is, perception<sub>2</sub>) then the ultimate authority on the order of the perceptions must be the subject. Therefore, as long as the subject reports the events to have occurred in some one particular order, it does not make sense to claim that there may be no answer to the question ‘In what order were the perceptions of the events consciously experienced?’. Any claims about alternative orderings of perceptions must therefore be seen as pertaining to psychological processes of which we are not conscious, including perceptions<sub>1</sub>.

In this respect, it is difficult to see how Mellor’s account could fail to be true: construing ‘perception’ as perception<sub>2</sub>, perceived temporal order of events must be equivalent to temporal order of the perceptions of those events, and it is from this, therefore, that we must derive our initial concept of temporal order. If we were to reject Mellor’s thesis, it looks as though we would be forced to give up important assumptions about the nature of our experience: for instance, we would have to concede that there may be cases where we are not conscious of something that we believe ourselves to be conscious of. This idea conflicts with our fundamental beliefs about conscious experience, and it is hard to imagine how it could be made to fit into a plausible account of our experience.

## V. CONCLUSION

It appears that Mellor's and Dennett's theses are compatible because their arguments serve different purposes. Mellor is trying to establish how we become aware of the direction of time, and is therefore concerned with conceptual and epistemological matters; whereas Dennett is investigating the role which our awareness of temporal order plays in shaping behaviour, which involves evolutionary and neurophysiological considerations. The experiments discussed by Dennett with the aim of discrediting the view that the order of perceptions of events determines the events' perceived order do not get to the heart of the matter in which Mellor is interested, for they say nothing about how we arrive at a concept of precedence. Further, because of this, the fact that Grey Walter's subject is able to infer any temporal order at all depends on the truth of Mellor's account.

Therefore in order for us to become aware initially of temporal order, our perceptions of events must be, in general, causally linked (and therefore temporally successive). This appears to be a fact about the structure of our perception, and it is difficult to see how this could be not so without our experience's being radically different. It is, nevertheless, true that we have other means at our disposal for inferring the temporal order of events, such as their causal order; and in certain cases, where the order of our experiences of two events differs from their actual order, such as when we hear a clock strike one just before seeing a solar flare, we must rely on such methods if we are to represent their order accurately. But since this requires a previously held concept of temporal order, it cannot be the causal order of the *objects* of our perceptions alone which informs us of their temporal relations: we must experience temporal order in some way. If we do not derive this concept of precedence by experiencing it in the shape of the causal order of our perceptions, it is difficult to imagine where else we might get it from. Therefore it seems that, at bottom, our representation of the temporal order of two events is nothing more or less than the temporal order of, and the causal relations between, our experiences of those events; and other methods of inferring their temporal order depend on this fact.<sup>4</sup>

*St John's College, Cambridge*

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