Philosophical Issues, 18, Interdisciplinary Core Philosophy, 2008

SENSING CHANGE

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§1 The Province of Sense

We can anticipate what is yet to happen, remember what has already happened, but our immediate experience is confined to the present, the here and now. So much seems common sense. So much so that it is no surprise to see Thomas Reid, that pre-eminent champion of common sense in philosophy, advocating precisely this position:

> It is by memory that we have an immediate knowledge of things past. The senses give us information of things only as they exist in the present moment; and this information, if it were not preserved by memory, would vanish instantly, and leave us as ignorant as if it had never been. (1855: 211)

Memory evidently does play an important role in our overall relationship with time. If I go to the post office this afternoon it will be because I still remember that I have a letter to post; if I arrive at the post office it will be because I have remembered the way there. In our day to day dealings with the world we are constantly guided (and motivated) by our memories. Memory also plays a role over the shorter term. If I hear a bell chime three times in a row, I would be unaware that the third chime *is* the third unless I remember having heard the first two. Reid is right about all this. However, his claim that immediate experience is confined to the present is, on reflection, less innocuous that it might seem.

Strictly (or properly) conceived, the present has no duration: it is simply the interface between what is future and what is past. Hence if our experience were confined to the present, it would be impossible for us to experience phenomena which require duration. More specifically, we would not be able

to *directly* experience change, succession or persistence. Reid draws just this conclusion:

> . . . if we speak strictly and philosophically, no kind of *succession* can be an object of either the senses or of consciousness; because the operations of both are confined to the present point of time (1855: 235)

Now this isn't so obviously common sense. Aren't there occasions (many of them) when we *see* a horse crossing a finishing line, or a car turning round a corner? Can't we *hear* the explosive roar of a crowd, or the barking of a dog? Can't we *feel* shivers running down our spine? Reid accepts that we do indeed often think and talk in these terms. He insists, however, that the apparent contradiction between strict philosophical truth and common sense (and common *experience*) is apparent rather than real:

> . . . philosophers and the vulgar differ in the meaning they put upon what is called *the present time*, and are thereby led to made a different limit between sense and memory . . .. though in common language we speak with perfect propriety and truth when we say that we *see* a body move, and that motion is an object of sense, yet when as philosophers we distinguish accurately the province of sense from that of memory, we can no more see what is past, though but a moment ago, that we can remember what is present; so that philosophically speaking, it is only by the *aid of memory* that we discern motion, or any succession whatsoever. We see the present place of the body; we remember the successive advance it made to that place: the first can, then, only give us a conception of motion, when joined to the last. (1855: 236-7)

For Reid our ordinary talk of seeing things move is intelligible, at least on its own terms, because in ordinary life we generally construe the present in a loose and flexible way. If it suits our purposes—and it often does—we allow 'the present' to denote a period of time, rather than a durationless instant. (There is no need for the period to be short: we sometimes refer to the present decade or century.) And since temporal intervals can contain change and movement, our ordinary ways of talking are not in the least paradoxical.

So far so plausible. But a serious worry remains. How plausible is Reid's proposed (precise, philosophical) delineation of the respective provinces of *sense* and *memory*? Motion certainly can be inferred in the way he describes, but can't it also be *perceived*? If I move my hand towards my face aren't I *seeing* my hand getting closer? Aren't I seeing it *moving* closer? If I hear a fast succession of notes, played on a piano say, don't I *hear* each note giving way to the next? Reid's claim that we only ever see 'the present place' of a moving body—and so never actually see a body *in motion*—does not ring true. Might it not be that while Reid's diagnosis does full justice to our *temporal talk*, it does not do full justice to our *temporal experience*?

There are certainly a good many philosophers who would agree with this verdict. According to Russell: '*Succession* is a relation which may hold between two parts of one sensation, for instance between parts of a swift movement which is the object of one sensation.' (1913: 65) Broad remarked: 'it is a notorious fact that we do not merely notice that something *has* moved or otherwise changed; we also often see something *moving* or *changing*. This happens if we look at the second-hand of a watch or look at a flickering flame. These are experiences of a quite unique kind; we could no more describe what we sense in them to a man who had never had such experiences than we could describe a red colour to a man born blind.' (1923: 351) In an auditory vein Husserl writes: 'The evidence that consciousness of a tonal process, a melody, exhibits a succession even as I hear it is such as to make every doubt or denial appear senseless.' (1964: 23)

Empirical findings support these claims. If we possess a specific organ for the detection of time *per se* it has yet to be discovered, but we do possess perceptual sub-systems which specialize in the detection of motion. The area of the visual cortex known as V5 is one such: evidence suggests that the neurons in this region are insensitive to colour and shape, but highly attuned to large-scale motions, of the sort associated with medium-sized physical objects. Stroke-damage to this region in neurological subject 'L.M.' resulted in the onset of *cerebral akinetopsia:* the severely degraded ability to perceive motion (Zeki, 1991, 2004; Rizzo *et al*, 1995). Her predicament was characterized thus:

> The visual disorder complained of by the patient was a loss of movement in all three dimensions. She had difficulty, for example, in pouring tea or coffee into a cup because the fluid appeared to be frozen, like a glacier. In addition, she could not stop pouring at the right time since she was unable to perceive the movement on the cup (or a pot) when the fluid rose. . . . In a room where more than two people were walking she felt very insecure and unwell, and usually left the room immediately, because 'people were suddenly here or there but I have not seen them moving.' (Zihl, von Cramon & Mai, 1983: 315)

Whereas we are able to see things moving in a smooth, continuous manner, the unfortunate L.M. can no longer do so.

Other findings point in the same direction. As the American psychologist Exner may have been the first to notice, if two brief visual stimuli are shown repeatedly in rapid succession—e.g., two illuminated spots on a screen a few inches apart, flashing on and off alternately—rather than seeing a succession of flashing spots, we see a single spot *moving* smoothly back and forth. The lesson? Our visual systems are not only capable of producing dynamic visual content, they are prepared to do so on the flimsiest of excuses. Perhaps we should not be surprised, for given the limitations of our optical systems, our eyes provide our brains with partial and fragmentary evidence of our surroundings, and our surroundings often contain objects that are in motion.

In any event, the effect is a happy one: substitute a rapid sequence of cinematic stills for the alternating spots—static images which depict a moving object at a succession of neighbouring locations—and the result is the clean, smooth motion apparent on cinema (and television) screens. Often called the *phi phenomenon*, this effect is also known as 'illusory motion'. In one respect this is appropriate, given that our perceptual experience is dynamic whereas the images on the screen are static, but there is also a sense in which it is misleading: in most cases on-screen movements are indiscernible from the real thing.

If motion and other forms of change can be directly experienced, what follows? It seems we have little choice but to conclude that Reid was mistaken in holding that our consciousness is confined to a momentary 'present point of time'. We must accept that advocates of the so-called *specious present* are correct in their claim that our immediate awareness can, in some manner, span a brief temporal interval. When introducing the term to a wider audience William James defined the specious present as 'the short duration of which we are immediately and incessantly sensible'; he also proclaimed it to be the 'original paragon and prototype of all conceived times.' (1890: 631) Unfortunately, while taking this step seems well-motivated, it also takes us into dark and dangerous waters. When it comes to explaining precisely how our consciousness seemingly manages to extend over time, friends of the specious present have very different tales to tell—and some of these tales are dubious in the extreme.

In what follows I will be arguing for the merits of one particular way of incorporating temporality into the realm of immediate experience: I call it the *Overlap Model*, for reasons which will become evident. Or to put it another way, I will be defending one particular way of making sense of the doctrine of the specious present. Although the Overlap Model has an agreeable simplicity, it can also achieve what more complex competing accounts fail to achieve: it can make sense of how our experience seems to be. My reasons for these claims will emerge in due course. Before proceeding further, it will be useful to address some confusions and misunderstandings, and draw some distinctions.

§2 Conflations, Confusions, Etc.

Broad tells us: 'I have never seen any account of the Specious Present which seemed even *prima facie* intelligible.' (1938: 281) Others put the point more strongly. According to Plumer: 'consistently construing the sensory present as an interval would cause nothing less than a *riot* in our conceptualization.' (1985: 4) No one finds it particularly problematic that we are able to perceive spatial extension, why is the temporal case so very different?

Several of the problems go back a long way. Chapter 15 of James' *Principles of Psychology*, 'On the Perception of Time', is undoubtedly one of the classics in the field. James clearly lays out the motivations for accepting an extended sensory present; there are brilliant phenomenological *aperçus*; there is an informative survey of relevant results from19th century psychophysics, together with some speculations as to the neurological underpinnings of our experience of change. But while achieving much of merit, James is also guilty of sowing a good deal of needless confusion.

When it comes to explaining how our awareness seemingly manages to extend through time there are two main schools of thought. Some maintain that *consciousness itself* spans a brief temporal interval; others maintain that although consciousness *seems* to embrace a brief temporal interval, it does not really do so. As the latter view is typically developed, the appearance of temporal depth is a consequence of a momentary cross-section of actual experience being apprehended together (and simultaneously) with representations of a temporal spread of phenomena. In the absence of any widely accepted labels for these approaches I will refer to them as follows:

> *The Retentional Model*: a specious present consists of a combination of two simultaneously occurring ingredients: (i) a momentary direct experience and (ii) representations (or *retentions*) of the recent past.
>
> *The Extensional Model*: individual specious presents consist of temporally extended episodes of experience that are apprehended as wholes.

Figure 1 below illustrates how proponents of each approach would view a simple specious present corresponding to the hearing of a succession tones, where the tones are experienced together *as* a succession.

These approaches can be developed in different ways, as we shall be seeing in due course, and each has its advocates.[1] For present purposes,

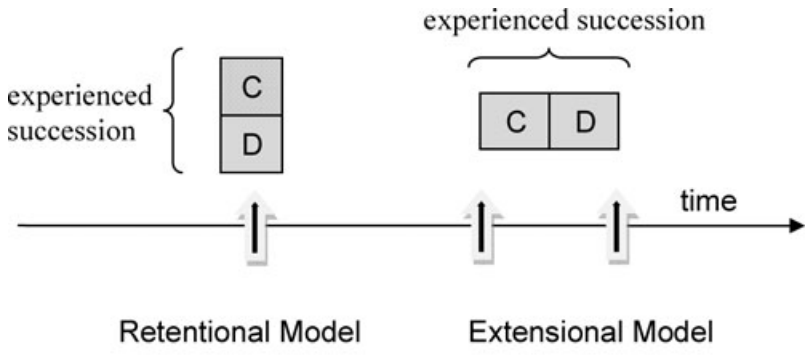

Figure 1. Two conceptions of the specious present

what is of interest is that James can easily be construed as advocating both approaches within the space of a few pages. Consider first this well-known passage:

> the practically cognized present is no knife-edge, but a saddle-back, with a certain breadth of its own on which we sit perched, and from which we look in two directions into time. The unit of composition of our perception of time is a duration, with a bow and a stern, as it were—a rearward—and a forward-looking end. It is only as parts of this duration-block that the relation of succession of one end to the other is perceived. We do not first feel one end and then feel the other after it, and from the perception of the succession infer an interval of time between, but we seem to feel the interval of time as a whole, with its two ends embedded in it. (1890: 609–10)

This talk of durations as being experienced as temporally extended wholes is entirely consistent with the Extensional approach, as is James' renowned rejection of atomistic conceptions of the stream of consciousness, conceptions which fail to recognize experienced transitions between neighbouring stream-phases. Consequently, it is not surprising to find Sean Kelly (2005) putting James firmly in the Extensional camp. However, in other places James seemingly advocates the Retentional approach. He tell us that 'what is past, to be known as past, must be known *with* what is present, and *during* the 'present' spot of time.' (1890: 629) In elaborating he cites James Ward, who writes 'In reality, past, present, and future are differences in time, but in presentation all that corresponds to these differences is in consciousness simultaneously.' (*ibid.*) There is no shortage of other passages along the same lines.

Of course James is by no means the only philosopher whose writings are susceptible to multiple interpretations, but his lack of clarity on the key issue of how the specious present is to be conceived may well have contributed to the widespread doubts over whether an intelligible account can be give of it.

No less damaging are the various estimates of the duration of the specious present which James supplies. The duration of specious present is supposed to be the *maximum* duration (or quantity of change, or persistence) that we can apprehend as a whole. It may help to conduct a simple experiment. Tap a table with your fingers, at a regular intervals of about a second; after each new tap, ask yourself if you can still hear its immediate predecessors. If the span of your auditory specious present is anything like mine, the answer will be 'no'. Similar experiments with other modalities delivers similar results: the span of the specious present (for any modality) is quite small, probably not more than a second, perhaps a good deal less. Yet what do we find James offering? He suggests that the most important part of the specious present—its 'nucleus'—is around 'the dozen or so seconds that have just elapsed,' (1890: 611) adding that this nucleus is surrounded

by a vaguer fringe of 'probably not more than a minute ago'. The claim is repeated: 'our maximum distinct *intuition* of duration hardly covers more than a dozen seconds (while our maximum vague intuition is probably not more than a minute or so).' (1890: 630) It is not obvious what he means by 'distinct' and 'vague' intuitions. It is altogether baffling how he could take a specious present to typically have a duration of a dozen or so seconds.[2]

The embarrassingly generous estimates and the saddle-back analogy yield yet more implausible results when they are combined. James neglects to explain precisely how the analogy should be understood, but it can easily give rise to a picture of the perceiving subject situated in the middle of a temporal interval, able to cast their gaze in either temporal direction. When one is told that the specious present extends over a sizeable period of time this interpretation is all but inevitable, but it is also problematic. Since the interval is one that is *perceived* we are led to conclude that the subject in question has the ability to *see* into both the past and the future. But how plausible is it to suppose that in our everyday perceptual experience of our environments we are all exercising an ability normally attributed only to clairvoyants? If we did have this ability there would be practical consequences. Just suppose James' estimates are along the right lines. Further suppose that you are about to embark on a timed 1500m run. Since you are eager to set a good time, you are straining to hear the starter's gun; since you become perceptually aware (even if only dimly) of the sound of the gun around 30 seconds before it actually occurs, you could—if you were so inclined—get a half-minute head-start. Since the official at the finishing line will see you crossing the line 30 seconds before you actually do, you might easily find yourself taking up to a minute off the usual sort of time for a 1500m—and do so without even trying.

Plumer's verdict that construing the sensory present as an interval has riotous implications is rooted in considerations of just this kind—the example of the race is his. If construing the sensory present as an interval truly entailed such bizarre consequences then the correct course would be to follow Reid in confining sensation to a durationless instant. But it does no such thing. The objectionable consequences derive not from the specious present doctrine *per se*, but from the particular interpretation of the doctrine Plumer extracts from James' writings. As for the 'seeing through time' charge, since Retentionalists hold that our consciousness does not in fact bridge a temporal interval (but only seems to), they are entirely immune to it. Extensionalists, by contrast, *are* committed to the view that our consciousness extends through time. But there is no need for them to follow James in holding that we have perceptual access to the future. Also, once a more realistic estimate of the span of the specious present is adopted, they are only committed to holding that we are aware of a second (or so) of change. This may still strike some as problematic—we will be returning to the issue of why—but it surely easier to accept than James' claim that we can see half a minute into the past and

future. And of course Extensionalists will also point out that we have good reason to suppose that our awareness *does* in fact extend over such periods: isn't this the simplest and most natural explanation of our ability to directly perceive change or movement or persistence?

In the eyes of some the specious present has features that are not just a little peculiar, but downright contradictory. In a recent discussion Le Poidevin dismisses it on these grounds:

> If we have a single experience of two items as being present, then, surely, we experience them as *simultaneous*. Suppose we are aware of A as preceding B, and of B as present. Can we be aware of A as anything other than past? (2007: 87)

There is certainly a real worry in this vicinity. It concerns the manner in which advocates of the specious present construe the relationship between (what we might term) *presence* and *simultaneity*. However, given that there are two fundamentally very different ways of conceiving of the specious present itself, there are two quite different worries in this connection. Extensionalists have the problem of explaining how it is that contents spread over an interval of ordinary clock time can appear successive if they also all seem present. Retentional theorists face no less of a challenge: according to them, the contents of the specious present are actually simultaneous (with regard to ordinary clock time), so how can it be that they appear successive? Or in slightly more formal guise:

> **Extensional Simultaneity Problem:** how is it possible for contents which are (i) experienced together, and (ii) experienced as present, to be experienced as anything other than simultaneous?
>
> **Retentional Simultaneity Problem:** how is it possible for a collection of contents which occur simultaneously to seem successive?

As we explore these approaches in more detail, we shall see that these problems may not be as insuperable as they might first appear.

Providing a viable account of individual specious presents is a significant problem, but it is not the only one. We also need a plausible account of the manner in which *distinct* specious presents combine together to form continuous streams of consciousness. We can remain continually conscious for hours at a stretch, and generally speaking each neighbouring brief phase of our stream of consciousness slides seamlessly into its successor—our streams of consciousness are not divided into discrete pulses. To illustrate: if I hear an evenly spaced succession of tones C-D-E-F-G, then even if the tones are of such a duration that only two can be experienced within a single specious present, I also hear *each* tone flowing into its successor—each tone is

diachronically co-conscious with its successor. Pulling these points together, there are two requirements which need to be satisfied:

> **The Dynamic Requirement:** change, succession, movement, persistence are all directly experienced over short intervals.
>
> **The Continuity Requirement:** specious presents must be able to combine to form a phenomenally continuous stream of consciousness.

Let us start by considering how the Extensional theorist can meet these challenges.

§3 Extensional Approaches

A straightforward way of making sense of a Jamesian 'duration-block' in Extensional terms is depicted in Figure 2 below. P is a single specious present. It consists of an experienced expanse of content that presents change (in this case movement) and extends through time in just the way it seems to: P is a temporally extended phase of a stream of consciousness. There are three points to note. First, and most importantly, P's contents are truly dynamic: in this case they possess the character (familiar from our own experience) of a *ball moving and falling*. Second, while the successive phases of the ball's motion are experienced as successive—as indicated by the smaller arrows shown beneath the ball's trajectory—these successive experienced phases are also parts of a single (extended) experience that is *sensed as a whole*. To put it yet another way, the successive phases are all connected by the relationship of *diachronic co-consciousness*. Third, although the contents of P are experienced as successive, there is a sense in which they are also all

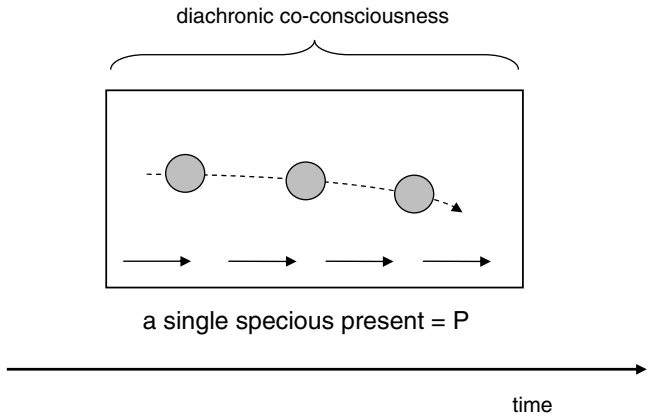

Figure 2. An Extensionalist specious present

experienced as belonging to the sensory present: all parts of the movement (in this brief interval) are equally and vividly *there* in the manner typical of directly perceived phenomena.

Viewing individual specious presents in this sort of way clearly satisfies the Dynamic Requirement: since each phase of P is experienced as vividly present, change is presented in as immediate a way as it possibly could be.

But isn't there also a problem here? Recall the (Extensional) Simultaneity Problem: if x and y are experienced together as present, how can they fail to be experienced as simultaneous? However, the difficulty here is more apparent than real. If we take 'x and y are experienced as present' to mean 'x and y are experienced as occurring at the same instant', then clearly x and y will be experienced as simultaneous. But by 'present' the Extensional theorist means (or should mean) something else: not a temporal location but rather a phenomenal characteristic. Contents that are experienced 'as present' in the relevant sense possess what we might term *phenomenal presence*: they possess the immediacy and vivacity that are characteristic of all phenomenal properties as and when they occur. A pain sensation has phenomenal presence while it is actually being experienced; if at some future time it is remembered then this phenomenal presence is lacking—though of course memory-images have their own distinctive (but different and less vivid) phenomenal presence. There is nothing problematic in supposing that instantiations of phenomenal properties at different times can have presence in this sense—my headache last week had just as much phenomenal force and vivacity at the time as my current headache. Given this, to suppose that the successive phases of a single specious present can all possess phenomenal presence is not in the least puzzling or problematic either.

So much for individual specious presents, considered in isolation. How do they combine to form continuous streams of consciousness? One option would be to hold that a stream of consciousness is formed from a sequence of duration-blocks laid end-to-end, in a manner akin to a row of bricks. Would the succession of specious presents P_1 and P_2 shown in Figure 3 (below) compose a unified stream of consciousness? It may not be obvious at first glance, but they would not. To suppose otherwise is to overlook the key distinction between a *succession of experiences* and an *experience of succession*. Since the tones C and D occur within a single specious present, they are experienced *as* successive, likewise E and F. But if under the current hypothesis D and E do not fall within a single specious present they are not diachronically co-conscious, and so are not experienced as successive. From a phenomenal perspective, in the absence of any experiential connection between the two, they might as well belong to distinct subjects, or different universes.

What is needed to secure phenomenal continuity? The remedy is obvious: it suffices to hold that D and E are also parts of a single specious present, a specious present which exists in addition to P_1 and P_2—hence

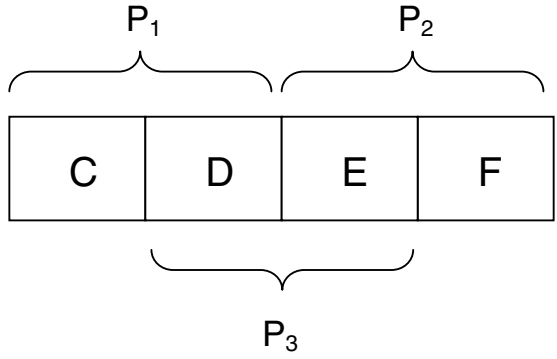

Figure 3. Overlap via the sharing of common parts

P_3 in Figure 3. Recognizing the existence of P_3 does not bring with it a commitment to any new experiences (or phenomenal contents); we have the same four experienced tones as previously. All we are recognizing are additional phenomenal *relationships* among these experiences. Under the initial hypothesis only the pairings (C-D) and (E-F) were phenomenally unified; under the new hypothesis the pairing (D-E) is also phenomenally unified. Hence phenomenal continuity is secured at very little additional cost.

The principal features of the Overlap Model are all present in this simple example. The key claim is that these simple overlapping structures are responsible for the moment-to-moment phenomenal continuity that we find in our ordinary streams of consciousness. Of course, the example is an artificially simple one, in two main respects. In a real-life stream, phases such as C and D would be entire cross-sections of a stream of consciousness, and as such their contents would be vastly richer than a single auditory tone. But this additional complexity does not affect the essentials: P_1 could overlap with P_3 by way of sharing a common part even if the parts in question possess highly complex and varied contents.

The second complication concerns the amount by which successive specious presents overlap. P_1 and P_3 overlap by precisely one-half (as do P_3 and P_2). This simplistic picture is unrealistic. Isn't the final third of C experienced with the third phase of E? And what about the final eighth of D and the final eighth of F? There is every reason to suppose so. To accommodate this, we need to introduce further a greater number of specious presents. To attain a more realistic picture, we can suppose successive specious presents are separated by just-noticeable differences, as depicted in Figure 4.[3]

So much for the basic features of the Overlap Model. It is in need of further elaboration and development. Quite how one construes the

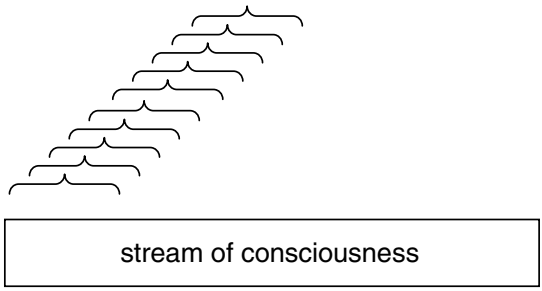

Figure 4. The Overlap Model: a more realistic picture

duration-blocks that are at the heart of the account will depend on one's general conception of consciousness and its contents, and there are different options here. Nonetheless, as a *framework* for thinking about our experience of change and persistence it has the twin merits of satisfying both the Continuity and Dynamic Requirements in a clear and unambiguous manner.

Before moving on it should be noted that the conception of individual specious presents employed in the Overlap Model is a distinctive one, and there are theorists who favour a very different account. Although this alternative conception is normally to be found in Retentional models—as we shall be seeing shortly—it is also possible to incorporate it into Extensional accounts. Whether this is desirable is another matter.

Thus far we have been working under the stipulation that the contents of a given duration-block all possess the same (maximum) degree of phenomenal presence. According to the alternative view, the contents within a single specious present systematically vary in the degree of presence they possess, with the more recent contents seeming more present (or *less past*) than earlier contents. James sometimes spoke in such terms, and Brentano was explicit about it: 'only someone capable of a presenting with different modes and of a continuously changing mode of presentation can have a presentation of rest and motion, of continuing to exist or of proceeding in time.'[4] (1988: 82) We can mark this difference thus:

> **Non-Modal Models:** all parts of the specious present possess phenomenal presence to an equal degree; there are no temporal modes of presentation.
>
> **Modal Models:** not all parts of the specious present possess phenomenal presence to the same degree; there are temporal modes of presentation.

That James was (on some occasions at least) drawn to the Modal conception is not surprising: it is not remotely plausible to suppose that the sound of a handclap (say) remains fully present in our consciousness for as long as half a minute. But once the span of the specious present is reduced to a second or

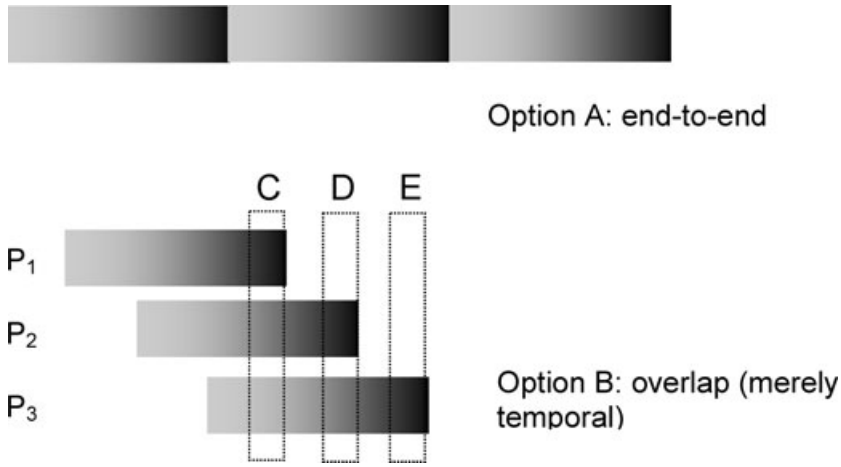

Figure 5. Overlap and the modal conception of the specious present

so, the need for temporal modes is by no means so evident. Is our perceptual discrimination so fine that we can discern different degrees of presence (or pastness) over periods of a second or so? In the light of this, the fact that the Overlap Model is Non-Modal should not be counted against it.

This point aside, there are sound reasons why Extensionalists should avoid the Modal route. How are we to suppose specious presents of this kind combine to form a stream of consciousness? The options are set out in Figure 5. Here each rectangle represents a single specious present, and the gradations of grey represent variations in presence/pastness: the darker the shade, the greater the presence.

Option (A), the Modal version of the end-to-end model considered (and rejected) earlier, is obviously hopeless. It predicts a rhythmic *pulsing* of presence which has no counterpart in our experience. What of Option B? On this view our streams of consciousness over short intervals are composed of a number of distinct but partially overlapping specious presents, existing side-by-side in a temporal superposition. (Hence P_1, P_2 and P_3 all form parts of a single stream of consciousness). The problem now is with *lingering* contents. Note the way the content C in P_1 continues to be perceived—albeit with gradually diminishing presence—in P_2 and P_3. If the contents of our consciousness were organized in this way then it would be impossible for us to hear a sequence of notes C-D-E without C still sounding when E is heard—but clearly, this is possible. In the case of vision, we would be unable to see objects move *cleanly* in the way that we do: if you were to move your hand slowly across your field of vision, you would invariably see it pursued by a ghostly contrail of fast-fading but still visible remnants of earlier perceptions.

Can't we eliminate this problem by supposing that specious presents overlap by *sharing parts*—as in the Overlap Model—rather than merely overlapping in time? Not without lapsing into incoherence. For the content C in P_1 to be numerically identical with its counterpart in P_2 (or P_3) it would have to possess the same phenomenal character as the latter. But this pre-requisite is lacking. By virtue of the fact that C possesses a different temporal modes in each of these specious presents, it has different intrinsic phenomenal characteristics in each. A *single* phenomenal item cannot possess different and incompatible phenomenal properties—it cannot be both fully present and *not* fully present. By eschewing appeal to temporal modes, the Overlap Model avoids this problem. Overlapping specious presents *can* share common parts if the parts in question possess precisely the same phenomenal properties—in this case, the same (maximum) degree of presence. It is because it posits precisely this that the Overlap Model can unify consciousness over time in a way its Modal counterpart cannot.

§4 Retentional Models

Why opt for the Retentional approach at all? Isn't it perverse to hold that our immediate experience of change is confined to (what are objectively speaking) durationless episodes of consciousness when it is an option to hold that our experience of change unfolds over time, in just the way it seems to? A prime motivating factor is the assumption that, as Reid put it, the operations of consciousness 'are confined to the present point of time'. Irrespective its merits, it is clear that anyone subscribing to this assumption has little option but to explicate our experience of succession along Retentional lines. Also important here is a consequence of this view—often only tacit—concerning what is required for phenomenal unity. Specifically, that so far as the phenomenal realm is concerned, a plurality of contents can only *be* unified if they are presented to an awareness which is localised at a single point in time. Brentano and Husserl both held this view—see Miller (1984: 109). Unfortunately, although this doctrine is influential, its proponents tend simply to take it for granted, without argument. This is a pity, for it is certainly possible to deny it: Extensional theorists do precisely this.

Issues of motivation aside, the Retentional approach can be developed in different directions, depending on whether one opts for a Modal or Non-Modal conception of the specious present. As previously, the Non-Modal theorist holds that the contents of a single specious present all possess the same degree of (phenomenal) presence, whereas the Modal theorists hold that they appear under different temporal modes of presentation. This difference aside, Retentional models share a common mechanism, illustrated in Figure 6. Here the horizontal line C-G represents the experiencing of a single, gradually rising, tone played on a violin. Each descending vertical line represents a distinct specious present (for the time being we can ignore

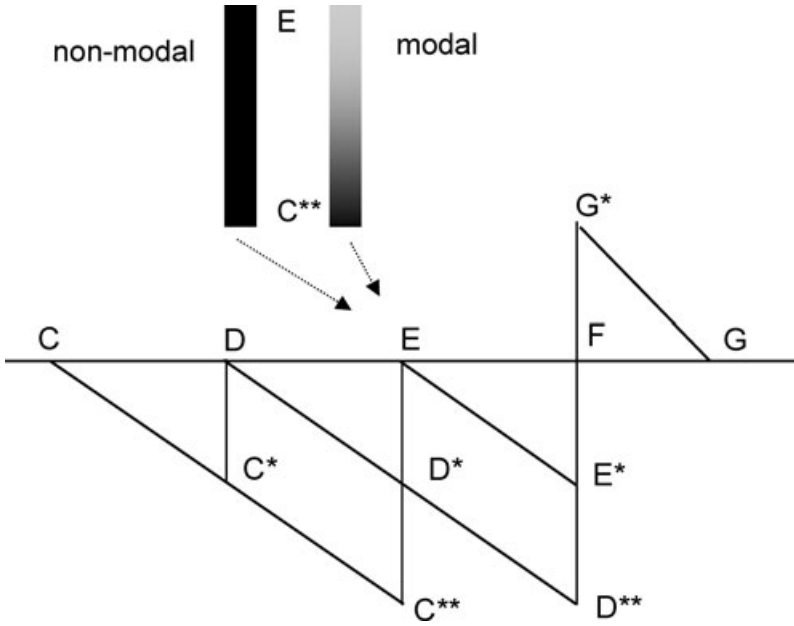

Figure 6. The Retentional approach: Although Husserl and Broad opt for a Modal conception of individual specious presents, the latter can be constructed Non-Modally, as indicated for E-C**

the lines above the horizontal axis, F-G*-G). Objectively speaking, each of these specious presents has zero (or minimal) duration; subjectively speaking, each possesses sufficient apparent temporal depth to manifest change and duration as it is immediately experienced.

The three descending verticals shown represent only a small subset of the specious presents that are involved in the course of this short stretch of experience: in reality they are closely packed, with no discernible gap between them. If we adopt the Modal conception—which Retentional theorists typically do—then the points closest to the horizontal axis represent contents possessing maximal phenomenal presence; points further away from this axis possess less and less of this quality (or appear more and more past). Hence in the case of E-C**, which represents the tone over the interval C-E, the point closest to E is a single moment of directly experienced tone-content—a 'primal impression' in Husserl's terms—and the remainder of the line represents the earlier phases of this segment of the tone, with D experienced as more past than E, and C as more past than either. Shifting the focus from tone-points to tone-phases, it can be seen how tone-phase D-E is experienced first as E-D* and then later as E*-D**: the same extended sound is thus experienced as sliding smoothly into the past. And what goes for this interval goes for others of similar duration.

Moving above the axis, whereas the descending vertical F-D** stands for a representation of the immediate past, the ascending vertical F-G* represents an anticipation of the immediate future. These future-directed counterparts of retentions were called 'protentions' by Husserl. Not all Retentional theorists incorporate a forward-directed component into their account—Broad's model is purely backwards-oriented—but it is an option. For those who do, a single specious presents has the more complex structure of the entire line [D**-E*-F-G]: a simultaneous collection of elements, representing a short span of time stretching from the recent past into the (anticipated) immediate future—in short, something very much akin to the 'saddleback' conception familiar from James.

So much for the bare bones. The viability of the Retentional approach largely depends on how well it succeeds in satisfying the Dynamic and the Continuity requirements. There are serious difficulties on both counts.

Non-Modal Retentionalists arguably satisfy the Dynamic Requirement as well as anyone. For just like their Extensionalist counterparts, they hold that a specious present contains a temporal spread of content, all of whose phases possess an equal (and maximal) degree of phenomenal presence. The only difference is that Retentionalists hold that this spread of content is not in fact spread through objective time in the way it appears. Here the (Retentional) Simultaneity Problem rears its head: how is it possible for a collection of contents which occur simultaneously to seem successive? By way of a reply, the Retentionalist can point out that if it is logically impossible for such contents to be temporally condensed, as it were, it is by no means obviously so. Do we know so much about the relationship between the phenomenal and the physical to be able to rule this out? Retentionalists (of both persuasions) can also argue that the divergence between the temporal properties of the contents carried by specious presents, and the specious presents themselves, is simply another manifestation of the widely recognized fact that there is no guarantee that the properties which feature in the *content* of a representation will also be possessed by the *vehicle* of a representation.

The Simultaneity Problem may not be insuperable, but Non-Modal Retentionalism is vulnerable on another front. Let us suppose, as previously, that the apparent duration of the specious present is approximately one second. According to the Retentionalist we are experiencing this much apparent change at each and every *instant*. It follows that over the course of one second vastly more than one second of change features in our experience: an infinite quantity if specious presents are densely packed, but even if we suppose there are only a hundred specious presents packed into each second, there will be more than a minute of experienced change per second. But where is this additional content? Over a one second period, aren't we typically aware of just *one second* of change? An account which generates significant quantities of surplus-to-requirements phenomenal content may not be incoherent, but it has a severe plausibility problem, to say the least.

In the light of this it is hardly surprising to find that Retentional theorists generally embrace the Modal approach. Brentano, Husserl and the later Broad all fall into this category. We are now no longer confronted with contents repeatedly featuring as fully present in successions of entirely distinct specious presents. Instead, any given (momentary) content only appears under this temporal mode once, after which it slides away, rapidly seeming less and less present in the subsequent specious presents in which it features. However, while the introduction of temporal modes assists with the surplus content problem, Modal Retentionalists are nonetheless confronted by an awkward dilemma.

Are retentions are akin to memories? It is a natural enough assumption; after all, we can call up memories of our past experiences, and the resulting memory-images co-exist simultaneously with ordinary perceptual experiences; perhaps combinations of momentary experiences and simultaneously occurring memory-images are responsible for our experience of change. In fact, if retentions were akin to ordinary memories, they would be incapable of doing the job required of them. A memory of seeing and hearing a bolt of lightning is very different from actually *seeing and hearing* one. In the latter case the lightning is bright, vivid, and (seemingly) out there in the world; in the case of the former, we are dealing only with (what is obviously) an inner mental image—an image that no one is in any danger of confusing with the real thing. Evidently, if retentions are to fulfil their allotted task, their phenomenal character must be much more like that of an actual *experience* than anything resembling a memory-image. But if we do suppose this, and we grant retentions the character they need, we are once again faced with the problem of surplus content. If at each instant we are aware of a second or more of immediately experienced change, we experience far more than we seem to.

Some Retentionalists—Husserl for one—have certainly been aware of this problem, but I know of none that has solved it in a clear and clearly satisfactory manner.[5]

This may seem bad enough, but there is worse to come. How can the Continuity Requirement be satisfied within the constraints imposed by the Retentional approach? If the Retentionalist is to be believed, our streams of consciousness are composed of successions of specious presents. Given that each of these is a distinct episode of experiencing—there is no overlap, no sharing of parts—how can they combine to yield the sort of continuity which is so characteristic of our experience? Recall the example given earlier: if I hear an evenly spaced succession of tones that are of such a duration that only two can be experienced within a single specious present, I also hear *each* tone flowing into its successor. And what applies for individual tones applies equally to entire brief phases of our streams of consciousness. It may well be that there are relationship of causal dependency between one specious present and the next, but we are seeking

phenomenal relationships, which are something altogether different and more distinctive.

On reflection, it is difficult to see how the problem can be solved without allowing neighbouring specious presents to be connected by the relationship of diachronic co-consciousness. For unless we allow that the successive brief phases of our streams of consciousness are *experienced together* how are we to accommodate the phenomenological datum that these phases are phenomenally continuous? But anyone who takes this step is, in effect, abandoning the Retentional approach in favour of the Overlap form of Extensionalism. But is there any alternative?

§5 Objections and Responses

Whereas the main variants of Retentionalism face serious difficulties, the Extensional approach, by contrast, at least in the guise of the Overlap Model, looks to be very promising. However, despite its advantages, this sort of approach has also come under fire in some of the recent literature. I will conclude by assessing some of these criticisms.

Sean Kelly finds the Extensional approach problematic in three respects. In the first instance he finds it hard to understand how we could be perceptually aware of something as no longer taking place. Second, as Kelly interprets the doctrine, it entails the claim that we experience *duration* directly, but how is this possible? Third, Kelly rightly points out that for the Extensional approach to be viable it must be able to explain how individual specious presents can be strung together to form continuous stretches of experience (i.e., it must conform to the Continuity Requirement). He maintains that no such explanation is available in Extensional terms, since the required connections require retentions: 'I will need to retain the prior Specious Present in order for the current one to be experienced as part of a larger whole.' (2005: 231)

Taking the last point first, the Overlap Model provides a straightforward account of how neighbouring specious presents are connected to one another without making any appeal to retentions: they overlap by sharing common parts or phases. It is difficult to envisage bond that is simpler or more readily comprehensible, or more apt to secure the sort of experiential continuity that we are seeking to explicate.

As for the direct experience of duration, if by this Kelly means that we can perceive intervals of time *per se*, then he may be right to be sceptical. But there is no reason why the Extensional theorist has to suppose that we possess a 'special sense for pure time' as James put it, for they can agree with James that there is no such thing: '*we can no more intuit a duration than we can intuit an extension devoid of all sensible content* . . . Awareness of *change* is thus the condition on which our perception of time's flow depends.' (1890: 620)

Kelly's first worry is whether specious presents, construed as duration-blocks, are really intelligible. How can a single experience, of a perceptual sort, include phases which seem anything other than fully present? (As Kelly observes, the time-delays inherent in the perceptual process mean we are always perceiving events that are no longer taking place, but a distant star surely *seems* fully present when we perceive it, even if we are seeing it as it was hundreds of years ago.) Retentionalists have an answer to this—the earlier phases are presented *as past*—but what has the Extensional theorist to offer? In fact, as I hope is clear, the non-Modal form of Extensionalism outlined in §3 has no difficulty here whatsoever. The earlier and later phases of a duration-block all appear *equally present* (they all see equally vivid), even though they are also experienced as a succession.

Of course, anyone who believes that concrete reality is itself confined to what the present instant contains will find the Extensional approach problematic. If the past simply does not exist, contents located in the past cannot be co-conscious with contents located in the present. (This thought may well underlie the Retentionalist doctrine that only items that are momentary and simultaneous can be phenomenally unified.) But while this view of time—*Presentism*—may have some appeal at the level of common-sense, it does not sit easily with the four-dimensional space-time ontology that (many believe) Einstein's theories of relativity require. By allowing phenomenal unity to connect contents that are separated by time as well as space, it is the Extensional approach that is more in tune with the findings of contemporary physics.

But is it also in tune with the findings of contemporary *psycho*physics? In a number of recent papers Grush has developed an information-processing model of perception. This 'trajectory-estimation model' is inspired by Husserl's writings; it is designed from the ground up to accommodate the notion that the contents of our perceptual experience are dynamic; it is also explicitly and deliberately Retentional in form.[6] In simple terms, Grush holds that our perceptual systems generate a continuously updated series of momentary representations of our environment. Each of these representations is a model of a subject's environment over a brief interval—corresponding to the duration of the specious present—and in Husserlian fashion each model comprises three components: a representation of what is occurring at the present moment, a representation of the immediate past, together with anticipations of the immediate future. Since the data our perceptual systems receive from our sense-organs is often fragmented and 'noisy', these internal models usually embody a good deal of extrapolation and educated guesswork. As a consequence, as new data is forthcoming, the content of the models—the 'story' they tell of what is happening over a particular interval—may change accordingly.

Grush argues that the trajectory estimation model's revisionary abilities allows it to make good sense of what is going on in a certain temporal

illusions. The relevant cases feature different forms of what is often called *backward masking*. Backward masking takes place when what is perceived as occurring over a brief interval (of up to a few hundred msec) is influenced, in often surprising ways, by what is perceived in the *final* phases of the interval. In the case of the phi phenomenon we encountered earlier, if a single flash of light A is followed, a short time later, by another flash B a short distance away, instead of perceiving a single flash at A and another at B, we perceive a single spot of light *moving* from the location of A to that of B; if the second flash doesn't occur, we see only A, an immobile solitary flash. In such cases it seems, bizarrely, that later experiences can exert an influence on what is perceived prior to their occurrence. Applying the trajectory estimation model to the phi phenomenon, Grush suggests the following. Prior to the time at which data pertaining to the second flash reaches our perceptual systems, the latter work on the (reasonable) assumption that just one flash has occurred, and so only a single flash features in the internal models (or specious presents) that are generated up to that point. As soon as data pertaining to the second flash arrives, however, our perceptual systems revise their assessments as to the likely environmental causes of the incoming sensory data. Since the new assessment is 'an object moving between the locations of A and B' this is the content which features in subsequent specious presents. As for the earlier representations featuring a single motionless flash, these are immediately forgotten and play no further role.

If we try to make sense of the same case in Extensional terms we are forced to ascribe inconsistent contents to the same segment of experience, or so Grush maintains. To see why, consider how an Overlap theorist will interpret the phi phenomenon. We can focus on two overlapping specious presents: the first of these, S_1, includes the initial seeing of the flash at A and what immediately precedes this; the second, S_2, includes this flash at A and what immediately *follows*, which includes the seeing of the flash at B. Or more schematically, $S_1 = [\ldots\text{-A}]$ and $S_2 = [\text{A-B}]$. Now, if S_1 and S_2 overlap by sharing common parts, the shared part—in this case A—must have the same intrinsic phenomenal properties in each of S_1 and S_2. But in this case, this requirement is not met: in S_1 the A-flash is motionless, whereas in S_2 it is perceived as moving. Evidently, given this difference we cannot coherently hold that the final phase of S_1 is numerically identical with the final phase of S_2. The Overlap Model thus breaks down (see Grush, forthcoming, §5).

We can agree that experiences cannot have inconsistent contents. But it would be wrong to suppose the Extensional theorist has no option but to interpret such cases in this way. Grush seems to be assuming that the contents featuring in Extensional specious presents reflect their environmental causes in an immediate and entirely unmediated manner. But there is no need for Extensionalists to embrace this view of the perceptual process. It is arguably more plausible to construe perceptual contents as representations that are generated in the brain only after a good deal of processing. This processing

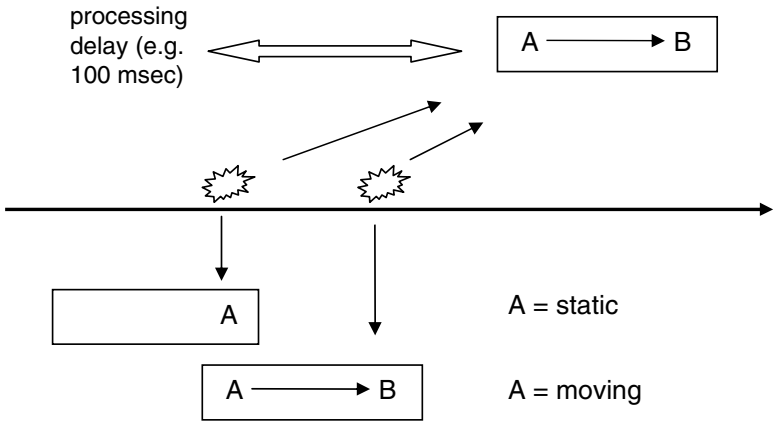

Figure 7. The phi phenomenon: two interpretations

makes for a delay—50-100 msec, say—but our brains put this to good use: they try to work out a single, coherent version of events on the basis of the fragmentary and (at times) conflicting data available to them. Only this 'final draft', as it were, reaches consciousness. Hence in the phi case, our perceptual systems reach the (in fact erroneous) conclusion that A is in fact a *moving* light, and this is the *only* way in which it features in our experience. While the initial solitary, static A-flash may well register in our perceptual systems, it does so only at a pre-conscious level. Since this flash in this form is not experienced, the problem of inconsistent perceptual contents does not arise. This way of construing matters is on display in the upper portion of Figure 7; Grush's interpretation is shown in the lower part of the diagram.

Interpreting matters in this way may save the day for the Overlap Model, but it is by no means *ad hoc*. Grush extends his neo-Dennettian multiple-versions approach to a range of related cases, including the *flash-lag effect* (when a light flashes next to a moving shape it appears lag behind the shape, rather than appearing at its side). However, as he concedes (2005: 214), in the case of the latter there is a well-supported alternative. According to the 'optimal smoothing' model of Rao, Eagleman and Sejnowski (2001), our perceptual systems take between 80-100 msec before finalising (and committing to experience) their interpretation of a particular item of perceptual data, and in doing so they take note of information received *after* the item in question.[7] This is precisely sequence of events illustrated in the upper half of Figure 7.

Time will tell which of these models most closely approximates the truth about these puzzling effects. But so far as the main issue is concerned, there are three lessons we can draw right away. The first is that Reid's delineation of the provinces of sense and memory is not only phenomenologically suspect,

it is far from obligatory: the doctrine of the specious present is not the hopeless case it is often assumed to be. Second: the road from psychophysics to phenomenology is by no means a straight or straightforward one. It may very well be that empirical results from psychology or neuroscience will help decide between the competing philosophical accounts of our immediate experience of change; there is much to be learned from work already done, and future work will further our understanding of these difficult issues. But establishing the true significance of relevant results is no easy task—we have just seen one illustration of this. The third and final lesson can be stated more succinctly: in the debates to come the Extensional approach may not hold all the aces, and it may not ultimately prevail, but it does at least start with several distinct and significant advantages.[8]

Notes

1. Brentano and Husserl are probably the best-known Retentional theorists, though Broad (1938) adopts a similar position, as does Lockwood (1989). Russell (1913), the early Broad (1923) and Foster (1991) favour (different forms of) the Extensional approach.
2. This raises another difficult issue: what precisely is the relationship between duration as it is *experienced*, and *objective* duration, of the sort measured by clocks? We all have a reasonably reliable idea of the amount of experienced change which can typically fit into one second as opposed to five or ten (as objectively measured), enough (I hope) to render the claims of this paragraph both readily comprehensible and plausible. But there is a certain elasticity in the relationship. It is a familiar fact that experiential durations of the sort which would normally occupy five minutes of objective time can take up less time than this (e.g., when waiting for a bus) or more (e.g., think of the way the time spent at an enjoyable party flies). But while this complicates the situation, it does not mean it impossible to use ordinary seconds and minutes to refer to subjective durations: we simply have to remember that such measures are approximate at best, and only valid under standard circumstances.
3. To accommodate the fact that when modeling the overlap-structure we can start from any *point* in a stream of consciousness, it may well be that in a still more realistic picture the packing will be tighter—even dense (in which case it would no longer make sense to talk in terms of 'successive' specious presents). Foster (1991: 248) entertains just such an account.
4. As I am construing the doctrine here, differences in temporal modes are due to differences in intrinsic phenomenal features—hence a content's 'appearing as (or under the mode) present' is not to be equated with 'being taken by its subject as as occurring *now*'. For a more recent (partial) defense of temporal modes, see Lockwood (1989: 267).
5. Some believe Husserl *does* solve the problem: see Gallagher (2003), Zahavi (2007); for arguments to the contrary see Dainton (2003).
6. See Grush (2005, and forthcoming).

7. Or as they put it: 'Why should the visual system delay its perception of an event to integrate information from the future? The smoothing model suggests that this is done in order to enhance perceptual accuracy in the presence of uncertainty and noise.' (2001: 1249)
8. My thanks to Alex Byrne and David Hilbert.

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