Attention Is Cognitive Unison
An Essay in Philosophical Psychology

Christopher Mole

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Highlights of a Difficult History

1.1 THE PRELIMINARY IDENTIFICATION OF OUR TOPIC

There is one remark from William James's *The Principles of Psychology* that all those who study attention can quote by heart. It is the remark that 'everyone knows what attention is' (James 1890: 381).

This remark does not, by itself, tell us very much. The quoting of it nonetheless serves two purposes, thanks to which it continues to be quoted with a frequency that nothing else in James's masterwork can match. The first purpose is to serve as evidence of attention's importance. Everyone knows what attention is because the role played by attention is so central to cognition that nobody could possibly overlook it. The second purpose is to stand in lieu of a definition. If everyone knows what attention is, then there is no need for psychologists interested in attention to start out by identifying which phenomenon is under investigation, and no cause for philosophical complaint when they fail to do so.

James, of course, had more to say. Having told us that everyone knows what attention is, he goes on to tell us that what everyone knows is that attention is 'the taking possession by the mind, in clear and vivid form, of one out of what seem several simultaneously possible trains of thought' (James 1890: 381). Philosophical controversies begin when we try to say anything more than this. The best tactic yet discovered for postponing those controversies, and so for allowing psychologists to get on with the kind of work that their methods are equipped for, is to quote James's bold remark and to leave things at that.

In this book we shall be facing up to the much postponed philosophical controversies about the nature of attention. But, as a preliminary, pretheoretical identification of our subject matter, it is still James's remark that provides us with our best starting place. We can expand upon that remark like this: For minds like ours, in environments like ours, more than one sequence of mental states is possible. We end up with the train of thought that we actually have partly by chance, but partly because certain things catch our attention, and partly because we direct our attention onto certain things. A theory of attention is an attempt to give an account of this nonrandomness in our coming to have

the train of thoughts that we in fact end up with. It is an attempt to explain the *selectivity* of our mental engagement with the world. That is what psychologists working on attention seek to explain. It is what this book is about.

James's remark that 'everyone knows what attention is' has an air of unanswerability about it, and an air of finality. It suggests that a more philosophically ambitious analysis of attention, such as we shall be attempting in chapter 4, would be superfluous. But this air of unanswerability should be looked on with suspicion. It is a signature trait of the bluffer. James's remark was, I think, a piece of bluff. When *The Principles of Psychology* was written it was far from clear that anybody knew what attention was. Karl Groos admitted as much, not very long after *The Principles* appeared: 'To the question, "What is Attention?"', he wrote, 'there is not only no generally recognized answer, but the different attempts at a solution even diverge in the most disturbing manner' (Groos 1896, cited by Tsotsos, Itti, and Rees 2005: xxiv).

James himself provides evidence that there was some confusion among his peers as to which phenomena were, and which were not, attention-involving. His chapter on attention includes, under the title 'To How Many Things Can We Attend at Once?', a discussion of experiments into the ability that we now call 'subitizing' (that is, the ability to see straightaway whether one, two, or three stimuli are present, without having to go through any procedure of counting them). But James goes on to say that 'it is obvious that such observations decide nothing at all about attention, properly so called' (384).

Subitizing was by no means the only phenomenon whose relation to attention was controversial at the time when James was writing. Disagreements about which phenomena should be taken as the paradigmatically attention-involving ones were widespread at that time, as they were in the decades before and after. In this chapter I shall be arguing that, underpinning these disagreements about attention's explanatory remit, there was a metaphysical issue. This issue is of the first importance for the attempt to provide an explanatory account of what attention really is. Various historical factors have conspired to make it an issue that has rarely been explicitly discussed.

One reason for revisiting the history of this issue is to show that metaphysical matters need not be arcane ones. They are woven into our foundational assumptions about the way in which mental phenomena should be explained, and woven, also, into our assumptions about the methods by which those phenomena can be examined. The research program of cognitive psychology is so fruitful and so fast-moving that it is easy for experimental psychologists to be tempted by the idea that a priori philosophical inquiry into the metaphysical underpinnings of the phenomena that they investigate is a futile pursuit, or, at least, that it is a pursuit long made obsolete by the advent of their empirical methods. The history that we shall be revisiting here shows this attitude to be mistaken.

The metaphysical question that this book attempts to articulate, and to answer, is a question that has to be settled at the first stage in the construction of any explanatory theory of attention. It is a question that psychology's founding fathers never quite squared up to. The current methods of empirical psychology do not enable us to dodge that question. On the contrary, it is our attempt to understand the explanatory importance of applying those methods that obliges us to take sides on it.

1.2 THREE APPROACHES

Although it was not the first work of psychology to discuss the topic of attention at length, James's *Principles* came at a time that was crucial to psychology's development as a science, and it was unusually influential. At the time when James was writing there were at least three different ways of approaching the topic of attention, each of which had its own advocates.

There were those who took the most fundamental thing about attention to be its involvement in willed *action*, and in the coordination of bodily movements. There were those who took the most fundamental thing about attention to be its involvement in *perception*, and the achievement of 'sensory clearness'. And there were those who took the most fundamental thing about attention to be its involvement in the direction of *thinking*, and in the coordination of one's internal monologue. We can produce examples that show each of these three approaches to have some intuitive appeal.

On behalf of the first approach we can produce examples in which the coordination and execution of action seem to be a paradigm case of attention. One obvious example is the attention required by gymnasts. A less obvious example is the attention that one pays when trying to move a partially numb limb. Both cases involve attention, but in neither case is there a perceived object the details of which we are trying to bring into view. The attention given to such cases therefore seems to be attentive *action*.[1]

On behalf of the second approach we can produce examples in which sensory focalization seems to be a paradigm case of attention. The attention paid by the piano tuner before making some fine adjustment to the pitch of a string gives us an example along these lines. Before making his adjustment the piano tuner is not performing any *action*. His task is the purely perceptual one of listening to the pitch. The attention given to such a task therefore seems to be attentive *perception*.

On behalf of the third approach we can produce examples in which pursuing a train of thought, without perceptual input or behavioral output, seems to be a paradigm case of attention. An example along these lines is the attention that we pay when performing mental arithmetic. Mental arithmetic certainly requires attention, but it may involve no

attempt to *perceive* anything, nor any attempt to execute an *action*. The attention given in such a case therefore seems to be attentive *thinking*.

Such examples show that, among the paradigm cases that a theory of attention needs to account for, there are cases of attention in action, cases of attention in perception, and cases of attention in cogitation.

The three approaches that these examples make plausible were each developed in some detail around the time when James was writing. The perception-centered approach was endorsed by several psychologists in Germany and in the United States (for a contemporary review, see Münsterberg and Kozaki 1894). It was influentially advocated by E. B. Titchener in his 1908 *Lectures on the Elementary Psychology of Feeling and Attention*, and again in his 1910 article 'Attention as Sensory Clearness'. The action-centered approach was taken in the 1888 edition of Alexander Bain's *The Emotions and the Will* (although in earlier editions Bain had been less sure of it). And the third approach—the approach centered on the role of attention in the coordination of reasoning—can be found in work from this period by G. F. Stout. Stout presents the view in 1891, in the introduction to an article on 'Apperception and the Movement of Attention', where he writes that

> intellectual ends are attained by an appropriate combination of movements of attention, just as practical ends are attained by an appropriate combination of movements of the body. If, therefore, we are to explain the process of thinking, we must clearly determine the nature of active Attention. (25)

It would be misleading to suggest that the plausibility of these three approaches led to a period of sustained normal scientific debate between the advocates of three well-articulated theories. What actually happened was that nobody had much of an idea about how the question that divided these three approaches might be settled. By the beginning of the twentieth century, the unsatisfactoriness of this theoretical situation had become a cause for occasional complaint. W. B. Pillsbury began his 1908 book on attention by remarking that the contemporary 'attention theories' were in a 'chaotic condition' (ix). And F. H. Bradley, in a paper from 1902, complained that some of the theories that were being offered as attempts to explain attention had lost touch with their purported subject matter entirely. He writes that 'In the case of attention the abuse [of words] has even been carried to such a point that attention has been used to include and cover what everyone does and must call a state of inattention' (1).

1.3 BRADLEY'S PROTEST

Bradley did not tell us whose abuse of words he was objecting to when he complained that the word 'attention' had been used to cover 'what everyone does and must call a state of inattention', but it is a safe bet that

James Ward was among those whom he had in mind. In an article written in 1885, surveying the entire field of psychology for the ninth edition of the *Encyclopedia Britannica*, Ward claimed that, for scientific purposes, 'attention' should be construed very broadly indeed. This claim was one that Ward continued to advance in his 1918 book *Psychological Principles*. In chapter 2 of that book Ward recommends 'extending the denotation of this term ['attention'] so as to include even what we ordinarily call inattention' (49).

On the face of it Ward's suggestion looks to be recipe for confusion, and for exactly the abuse of words that Bradley was complaining about. If we allow 'attention' to be used in a way that includes 'what we ordinarily call inattention' then it seems we allow the term to become uselessly broad. That may be a little unfair to Ward. He was not recommending that 'attention' be used in an *entirely* unconstrained way. (He was, I think, trying to advance the view that the word 'attention', thanks to its verbal form, 'attend', is better suited than the word 'consciousness' to play the role that the latter word has had assigned to it.) But, whether or not Ward's view was ultimately a sensible one, we can see why Bradley thought that such liberal use of the word 'attention' was worth complaining about. If we use the word 'attention' in such a way that all conscious states involve attention to some degree, even those idle, tuned-out states that we naturally describe as instances of inattention, then we lose our grip on the selectivity and directedness that our preliminary characterization of attention took to be of its essence.

Bradley's reluctance, in 1902, to name the theorists whose unconstrained use of the word 'attention' he objected to may have been partly owing to the fact that Bradley himself, in 1886, had advocated a view of attention that was notable for the slightness of the constraints that it imposed. The view found in Bradley's earlier work is that

> any function whatever of the body or the mind will be active attention if it is prompted by an interest and brings about the result of our engrossment with its product. (316)

That is clearly not a view that puts much constraint on the things that can be called 'attention'. It may be no surprise, therefore, that the later Bradley, when complaining that the use of 'attention' had become too unconstrained, was happy for his earlier view to be neglected. A footnote to his 1902 paper mentions that the view defended there departs from his 1886 view but tells us that 'it seems not worth while to ask in detail how much' (2).

Bradley's earlier view was something that he never developed in any detail. The 'chief object' that he claimed for the paper in which that view is found was not to elucidate his positive theory. It was 'to record a kind of protest' (Bradley 1886: 21). The remark quoted above, about interest and engrossment, is more or less all the elucidation that the positive theory gets.

It will be one of my claims in what follows that the approach taken by Bradley's early positive theory is, in fact, well worth pursuing, but since Bradley's 'chief object' was not the development of that theory but the recording of 'a kind of protest', we need to know, if we are to understand him, what it was that he was protesting against. Several aspects of the contemporary treatments of attention seem to have been objectionable to him:

> I observe a tendency to break up the life of the soul, to divide it into active and passive factors, or to suppose a passive beginning with a supervening activity, the latter by some identified with an irreducible act of attention. I believe this tendency to be a serious obstacle to psychology, and there is another tendency not less injurious. Attention may be given such a position that the reader cannot tell if it is primary or derivative, or, if primary, whether it is an original element or something that supervenes; or, again, whether it is one of a class of activities, or one function exerted on different objects. (Bradley 1886: 305–306)

The first part of this remark—the bit about 'a tendency to break up the life of the soul'—is certainly evocative of what might have been objectionable in the conceptual schematizing of Bradley's contemporaries. The second part of the remark is rather too jargonized to be illuminating. What does Bradley mean by being 'primary', and how is the property of being primary meant to contrast with the property of being 'an original element'? What is the notion of 'supervenience' that is in play here? (It clearly is not the same as the notion that metaphysicians currently denote with that word.) One suspects that, in writing this passage, Bradley was rather more concerned with illustrating the reigning confusion than with showing us a way out of it.

We can bring Bradley's positive theory more clearly into focus, together with his point of protest, by contrasting his explanatory approach not only with the approach of Ward, for whom 'attention' and 'consciousness' were virtually synonymous, but also with the approach taken by James in *The Principles of Psychology*. The approach that James advocated was one version of the approach that Bradley objected to, and James himself devotes a good part of his chapter on attention to what he takes to be his point of dispute with Bradley. It will be helpful, therefore, to look at James's approach before returning to get a clearer view of Bradley's protest, and of the theoretical position that motivated it.

1.4 JAMES'S DISJUNCTIVE THEORY

At the time when he wrote *The Principles of Psychology* James was sympathetic to something rather like the perception-centered approach to attention. Early in chapter 11 of *Principles*, shortly after the remark about everyone knowing what attention is, James writes that 'sensory

focalization' is 'of [attention's] essence' (381–382). Later in that chapter he attempts to provide an account of the 'intimate nature' of attention by identifying the particular processes that constitute attention's instances. Two processes are identified:

> *The accommodation or adjustment of the sensory organs*; and
>   *The anticipatory preparation from within of the ideational centres concerned with the object to which attention is paid.* (411)

The first of these processes is a familiar one. By 'the accommodation or adjustment of the sensory organs' James means such things as pointing one's ears in the right direction, bringing one's eyes into focus, taking a sniff, and so on. The second of the processes is described by James in somewhat less familiar terms, but his point is again quite straightforward. 'Anticipatory preparation' of 'ideational centres' is simply James's way of characterizing *imagination*. His claim here is that some instances of attention consist in imagining the things one is attending to, or looking for. Taking both of these processes together, we find that James is advocating a disjunctive theory according to which attention is constituted either by the processes underpinning imagination, or else by the processes of sensory orienting.

James presents this theory of attention as if it were a theory that enjoys a good deal of intuitive appeal. These 'two physiological processes', he writes, 'immediately suggest themselves as possibly forming in combination a complete reply' to the question of 'The Intimate Nature of the Attentive Process' (1890: 411). In suggesting that this disjunctive analysis of 'the attentive process' immediately suggests itself as *complete* James goes too far since there are instances of attention that seem to involve neither imagination nor sense organ orientation. But if James's claim had been only that imagination and sense organ orientation can each play a central role in *some* instances of attention, then his claim to intuitive appeal would ring true. We can find clear examples that illustrate what James must have had in mind here, just as we could find the examples of the attentive gymnast, attentive piano tuner, and attentive mental arithmetic solver to illustrate the action-centered, perception-centered, and reasoning-centered views from the works of Bain, Titchener, and Stout.

Examples illustrating the plausibility of the first disjunct of James's claim—the claim that sense-organ adjustment can be a way of attending—are relatively commonplace: If, sitting in the audience at the symphony, I want now to attend to the strings, having previously been attending to the brass, then it seems that an appropriate reorientation of my sense organs is one way to go about doing it. This 'overt attention', as more recent discussions have dubbed it, is the easy case. For the second disjunct of James's claim—the claim that preparatory imagination can be attention-constituting—the clearest examples are not quite as familiar. But once we have seen them, we can see that they are also strong in their intuitive appeal. The example mentioned by James himself is the

following: When listening to a note played on the piano one can hear a number of harmonic overtones in addition to the fundamental frequencies of the note played. Suppose you want to listen for the third overtone of a particular note. (If you are a piano tuner then this will be the sort of thing that you have to do routinely.) One way to go about attending to the note so as to hear the third overtone is by first listening to the pitch at which that overtone sounds, and then imaginatively keeping that pitch in mind while listening as the note is struck. In this case the imagining of the pitch and the attention that one pays in listening for the overtone seem to be the same thing.

James took this example from Hermann von Helmholtz's 1870 treatise on sound perception. For those of us who are not piano tuners it may not be an everyday example of attention, but such shifts in what one is listening for in a single auditory stimulus are familiar enough. They are certainly possible, and they are certainly attention-involving. We need our theory of attention to allow for such shifts. The part of James's theory that is concerned with imagination is an attempt to do so.

Some readers will be sure to have a qualm at this point, since I have just made a psychological claim on the basis of introspection and informal observation. Many psychologists disapprove of introspection and of informal observation. They have perfectly legitimate reasons for doing so. Ideally, one would like to puts James's and Helmholtz's ideas about attention and preparatory imaging to a more rigorous empirical test. I know of no studies that do exactly that, but Harold Pashler, in his 1997 textbook on attention, reports a study in which subjects were required to form a visual mental image of an item and then, forgetting about that image, to perform a task requiring them to detect the occurrence of a digit in a rapidly presented sequence of pictures (249). The results that Pashler observed comport nicely with what James suggested. When presented with a sequence of pictures it seems that, irrespective of the demands of their task, subjects do give attention to the pictures of recently imagined items, just as James would have predicted. The evidence that attention is paid to these items comes from the fact that they elicit an 'attentional blink': If the digit that the subject has been looking out for comes shortly after the imagined image, then subjects are liable to overlook it. In Pashler's experiments, then, prior imagination of a thing does seem to bring it about that the thing is attended, much as James thought.

Whatever their empirical credentials, the examples of switching attention to a different instrument in the symphony and switching attention to a different aspect of a note played on the piano give us some insight into James's disjunctive theory, and into his reasons for finding it plausible. With that theory before us, as an example of the sort of thing that F. H. Bradley was protesting against, we can now begin to see the source of Bradley's dissatisfaction.

1.5 THE SOURCE OF BRADLEY'S DISSATISFACTION

We have seen that James's claim about attention's links to orienting and to imagining is plausible enough. What was it, then, that Bradley found in approaches such as James's that he wanted to protest about? The problem that Bradley had with the theorists of attention who were writing at the end of the nineteenth century was not that they had failed to identify any psychological phenomena in which attention was clearly displayed. That was very far from being the problem. James, we have seen, identified phenomena in which attention seems clearly to be displayed. So did Helmholtz, Bain, Titchener, and Stout. All of their proposals seemed plausible (and they continue to seem plausible, even in the face of more recently gathered evidence). The source of Bradley's dissatisfaction with his contemporaries was not that they had identified no clear examples of attention-involving phenomena, but that there were too many such examples, and the various examples of attention-involving phenomena that these different theorists had identified seem not to have much in common as far as their constituent processes go. Nor did any one of these examples seem to have explanatory priority over the others. It therefore seemed that the contemporary accounts of the processes that are involved in particular instances of attention did little to help us in formulating a generalizable explanatory theory of what attention is. And the project of identifying any particular process as the 'special activity of attention' therefore seemed wrongheaded. When Bradley titled his 1886 essay 'Is There Any Special Activity of Attention?' it was in order to urge that the question be answered in the negative.

To readers familiar with the recent empirical literature on attention the diversity among the processes that Bradley's various contemporaries took to be involved in paradigm cases of attention may sound like a familiar fact, and the metaphysical lesson that Bradley took from it—that there is no 'special activity of attention'—may be thought to be something that we now find obvious. Recent discussions of attention frequently note the plurality and heterogeneity among the paradigm cases of attention, and urge us to accept that our theories of attention must be corresponding heterogeneous (for an influential example of such reasoning, see Parasuraman 1998). Those who attempt summaries of the current debates typically preface their discussions with a remark to the effect that 'there may be numerous component processes behind our attentional abilities' (Driver 1998: 298), or else they claim that 'attention' is 'an umbrella term for a variety of psychological phenomena' (Styles 2006: 1) and take this as showing that 'to try to define attention as a unitary concept is not possible and to do so would be misleading' (Styles 2006: 9). We shall return to these ideas from the current literature in chapter 6. The point to note presently is just that their familiarity should not be allowed to mislead us as to the point that Bradley

was making. The lessons that current theorists draw from the diversity among attention's instances are *not* the lesson that Bradley drew.

When Bradley objected to views of attention along the lines of James's disjunctive two-process view it was not because he thought that two was not a high enough number. He was not claiming simply that there were many other varieties of attention, in addition to those that theorists such as James had taken account of in talking about sensory orienting processes and the processes of preparatory imagination. In fact, Bradley did *not* think that there was a great diversity among the attention consti-tuting processes. When it comes to naming attention-constituting pro-cesses, Bradley, like James, provides a list of just two: 'redintegration' (that is, the following of an association between two ideas) and 'blend-ing' (the forming of such an association). He writes that 'in attention there is either no activity at all beyond the common processes of red-integration and blending, or, if the activity exists, itself *is* not attention' (1886: 316).

Bradley's reason for rejecting the project of identifying attention-constituting processes was not that he thought, as current psychologists do, that the attention constituting processes are too many and too vari-ous. What was it, then, that Bradley was objecting to? An analogy may help us to get clearer on that, and to see how Bradley's objection differs from the current literature's rejections of one-process views of attention.

For the purposes of this analogy, imagine that we have come across a group of social scientists who are attempting to characterize the under-lying nature of the process that constitutes *employment*. We can imag-ine one of these scientists, an analogue of James, observing that lots of instances of employment involve manual labor and concluding, on that basis, that the processes responsible for arm and hand movements are the underlying processes of employment. This scientist might then observe that there are lots of *other* instances of employment that do not involve manual labor but that do involve clerical work. He might conclude that in those cases the processes of producing and arranging documents are the employment processes. Having seen that these two theories each seem right for their own range of cases, he might become a disjunctivist. His theory of the 'intimate nature' of the employment process will be that it is either the process of arm and hand orientation, or the process of producing and arranging documents. Meanwhile, some other theorist of employment (analogous to Titchener) might notice that some instances of employment involve patrolling and being on the look out for certain things. He might propose a theory according to which the 'intimate nature of the employment process' involves perceptual processing. The analogue of James and the analogue of Titchener might take themselves to be engaged in a serious disagreement about the fundamental nature of the employment process. In fact, of course, they would both be mis-taken. The point to take particular care over here is this: The scientists we are imagining would *not* be making a mistake about *which* processes

constitute paradigm cases of employment. Nor would they simply be mistaken about how many such processes there are. The mistake is a much more fundamental one. It is a mistake about the way in which an attempt to explain employment should proceed. In taking it that the explanation should proceed by identifying the processes that constitute employment these imagined scientists would be making a metaphysical mistake: a mistake about the sort of thing that employment is.

It bears emphasis that the thing we find ourselves wanting to say about the imagined project of identifying the process of employment is *not* the thing that the current textbooks say about attempts to identify the process of attention. We do not give a correct diagnosis of what has gone wrong in the imagined debate about employment by saying that 'employment' is an umbrella term, or that it is a term for which no definition can be given, or that analogue-James and analogue-Titchener each had a part of the truth. We do not say that the theories of analogue-James and analogue-Titchener should be reconstrued as contributions to a heterogeneous, family-resemblance–based theory of employment. What we say about analogue-James and analogue-Titchener is what Bradley says of his contemporaries' attempts to understand attention: It is all wrongheaded. For the purposes of explanation there is no point in starting a catalog of the processes that constitute employment. Any process whatever, of the body or the mind, will be a case of employment, as long as it is done in the right way and for the right reasons. A theory of employment should specify the way and the reasons. It should not catalog the constituent processes.

Bradley's complaint against a project like James's was not that the *wrong* processes had been identified as the attention constitutors, or that too few processes had been identified. Bradley did not deny James's claim that imagination and sense-organ accommodation had important roles to play in many instances of attention (Bradley 1886: 307). Nor, when discussing Bain's claims about motor coordination, did Bradley take issue with the idea that motor coordination *can* be attention constituting. Nor, one imagines, would he have objected to Stout and Titchener when they claimed that there are instances of attention in which cogitation and sensory clearness are crucial. Bradley's protest was a metaphysical one. He was objecting to the idea that the identification of these processes contributed even a part of the explanation of what attention is. His own view was that there is no explanatory value in starting a catalog of the attention-constituting processes because *any* process could constitute attention, as long as certain conditions were met (conditions that his remarks about 'engrossment' and 'interest' gestured at but did not adequately specify). This is what he means when he writes:

> We have found nothing in attention that is not derivative, nothing which could justify our placing it among the primary elements of mind. In attention there is either no activity at all beyond the common

processes of redintegration and blending, or, if the activity exists, itself is not attention. Any function whatever of the body or the mind will be active attention if it is prompted by an interest and brings about the result of our engrossment with its product. There is no primary act of attention, there is no specific act of attention, there is no one kind of act of attention at all. (Bradley 1886: 316)

James's question about the 'intimate nature of the attentive process' was, in Bradley's view, a question with a false metaphysical presupposition, not because it supposed that there was just one or two such process, but because it supposed that attention is a matter of executing particular *processes* at all.

The metaphysical point of Bradley's protest is worth laboring, not only because it is a point that is easily mistaken for the less radical claims that we find in the current literature, but also because it is a point that gets lost almost as soon as Bradley makes it. Bradley himself, although he was no slouch when it came to making metaphysical points elsewhere, never spelled the point out very clearly, partly because, as we have seen, he was more concerned with registering a 'kind of protest' than with articulating his positive view, and partly because, as we have also seen, he changed his mind before that positive view was ever brought clearly into focus. Nor did anybody else manage to give a very clear articulation of the metaphysical issue that separated Bradley from James, and from his other contemporaries.

The failure to articulate this issue was partly owing to the fact that the philosopher/psychologists of this period lacked the necessary metaphysical vocabulary. Works from this time frequently display a proliferation of jargon, corresponding to the points where different authors take differing metaphysical positions, and this leads to a lack of clarity about what needed to be explained and how. An example is William Cyples's 1880 book, *An Inquiry into the Process of Human Experience*, in which Cyples attempts to define 'organization' as 'the interhappening of structural statics with related dynamical activities' (10). Such definitions earned Cyples the scorn of his reviewers (Sully 1880), but they were a reflection of a widespread uncertainty about which of the concepts employed in the course of stating psychological theories were in need of clarification and about how such clarifications were to be given. Psychology did not yet have an established policy about what a psychological explanation should look like. It lacked an established vocabulary for articulating the metaphysical issues that such explanatory questions depend on.

This lack of an established vocabulary in which to frame psychology's underlying metaphysical issues prevented Bradley and James from giving a clear account of the metaphysical point about which they were disagreeing. Bradley, as we have seen, frames the issue in terms of 'special activities', 'original elements', 'supervenient activities', and 'active and passive factors' (Bradley 1886: 306). James, in contrast, frames the issue as a dispute between a 'cause theory' and an 'effect theory'

(James 1890: 424). James's presentation of the issue seems to be the more straightforward one, but James also tells us that settling his dispute with Bradley would require us to take a stand on 'one of those central psychological mysteries which part the schools': the mystery of whether the attention constituting activity was caused 'by other brain-cells, or by some spiritual force' (423). By the end of his discussion, James is characterizing the issue that separates him from Bradley as a dispute between 'believers in mechanism' and 'believers in a spiritual force' (429).

Even without James bringing 'spiritual forces' into the discussion, the debate here seems fraught with confusion. Today we clearly distinguish claims about causation from claims about supervenience. By our lights, then, James and Bradley seem to have been talking past each other. James took Bradley to be denying a claim about causation. Bradley took himself to be denying a claim about supervenience and about 'original elements'. But Bradley and James cannot just have been talking past each other. There was a genuine disagreement between them: James, as we have seen, thought that attention is the sort of thing that can be accounted for by identifying the 'intimate nature' of the processes that constitute it. Bradley thought that, for the purposes of explanation, the question of which processes constitute attention was a wrongheaded one.

There is a genuine metaphysical question at stake here, a question about the sort of thing attention is and, correspondingly, about the sort of explanation that should be given of it, but James and Bradley never quite put their finger on the metaphysical point that lies at the heart of the matter. Because of Bradley's abandonment of his side in the debate, and because of James's misconstrual of that debate's substance as being tied up with an issue about spiritual forces, the psychologist's project of accounting for attention got under way without squaring up to the fundamental question of whether the metaphysics of attention is such that it can be explained by the identification of its constituent process, or whether, as in the case of employment, there is a fundamental mistake in the attempt to give such an explanation.

1.6 BEHAVIORISM AND AFTER

In the opening decades of the twentieth century psychology's desire to dodge metaphysical questions was matched by an enthusiasm among philosophers for approaches that attempted to show how such a dodge could be legitimated. Logical positivism's appeal in this period was owing, in part, to its promise to do away with large swathes of metaphysics. It attempted to do so by claiming that metaphysical questions, like all questions not amenable to resolution by straightforward observation, were literally meaningless. The behaviorism that dominated psychology in the first half of the twentieth century was the result of applying this logical positivist criterion for meaningfulness to questions about the mind.

The dominance of behaviorism in this period resulted in attention being demoted from its central place in psychology. As a result, the metaphysical/explanatory issue on which Bradley and James had been divided became all but invisible.

This was not because the behaviorists had nothing at all to say about attention. John Dashiell's 1927 *Fundamentals of Objective Psychology* offered a behaviorist account of attention 'as a form of posturing' (284). And, some decades before behaviorism came to be established as a school of thought, Théodule Ribot's 1889 book, *Psychologie de l'attention*, had offered a strikingly behaviorist approach to attention, which Ribot asserts with characteristic rhetorical flamboyance:

> Are the movements of the face, the body, and the limbs and the respiratory modifications that accompany attention, simple effects, outward marks, as is usually supposed? Or are they, on the contrary, *the necessary conditions, the constituent elements, the indispensable factors of attention*? Without hesitation we accept the second thesis. (25)

Despite the boldness of Ribot's proto-behaviorist treatment of attention, the attempts, once behaviorism got under way, to identify a set of movements, postures, or respiratory modifications as essential to attention was generally recognized to be hopeless. As Gilbert Ryle notes, it is not only attention that resists simple behaviorist analysis but also the class of 'heed concepts' more generally:

> When a man is described as driving carefully, whistling with concentration or eating absent-mindedly the special character of his activity seems to elude the observer, the camera and the Dictaphone. Perhaps knitted brows, taciturnity and fixity of gaze may be evidence of intentness; but these can be simulated, or they can be purely habitual. (1949: 133)

The problem for the behaviorist is that attention may be given to all sorts of stimuli, and all sorts of responses may be performed attentively. For that reason attention is exactly the sort of thing that a behaviorist theory, given in the form of rules for stimulus/response mapping, will always struggle to accommodate. Most of the behaviorists who set the agenda for psychology in the first decades of the twentieth century were therefore happy for attention to drop out of view.

Behaviorism ceased to be the dominant paradigm in psychology over the course of the 1950s. Attention returned to the psychologist's explanatory agenda over the same period. These two tendencies were intimately linked. The Second World War had lent a new urgency to questions about such things as a person's capacity to pay attention to multiple radar screens for prolonged periods. The research that such questions prompted revealed interesting effects. These cried out for experimental study, and for a theory to explain them. The rehabilitation of attention as a topic for scientific study was called for, but that rehabilitation required

the breaking of the public-observability constraints that governed the positivism-influenced varieties of behaviorism that were dominant in psychology at the time. It required the rejection of the behaviorists' claim that any properly scientific theory should be given using only terms that refer to publicly observable entities.

The most authoritative scientific rejection of that positivistic basis for behaviorism was given by Donald Broadbent in his 1958 book *Perception and Communication*; a book that also set the agenda for almost all thinking about attention in the decades that followed. It came at a crucial time for psychology's development.

The year before Broadbent's book had seen the publication of B. F. Skinner's *Verbal Behaviour* (1957), in which Skinner made an ambitious attempt to apply a straightforwardly behaviorist explanatory approach to distinctively human aspects of cognition. Thanks to Noam Chomsky's vituperative review of Skinner's book, published in 1959, the failure of Skinner's project was conspicuous and remains famous. That failure made a major contribution to the abandonment of behaviorism and to the corresponding rise of cognitive psychology. But the shift away from behaviorism that followed was not owing to Skinner's failure alone. It also had much to do with the increasingly detailed articulation of a scientifically respectable alternative to the behaviorist paradigm. Chomsky's own book, *Syntactic Structures*, published the same year as *Verbal Behaviour*, and Donald Broadbent's *Perception and Communication*, published the year after, together established an alternative to the behaviorist framework. In their different ways, and drawing on different conceptual resources from the then emerging field now known as 'informatics', they suggested a framework that would enable psychologists to study cognitive phenomena while avoiding both the methodologically unsatisfactory method of introspection and the explanatorily inadequate method of mentioning nothing but publicly observable behaviors and stimuli.

Broadbent, to a greater extent than Chomsky, retained the behaviorists' idea that a theory in cognitive psychology was answerable, in the first instance, to quantifiable data about publicly observable behavior, but both Broadbent and Chomsky took it that, contrary to behaviorism's positivistic strictures, the postulation of internal structures and processes can be a respectable component of a scientific account of a mental phenomenon, even if these structures are not directly observable. Chomsky's work on syntax showed how the sorts of claims that the behaviorists had rejected could be made precise in the form of claims about the sequence of operations by which a representation gets translated from one form into another. Broadbent's distinctive contribution was to show how our understanding of a subject's internal processing architecture could be disciplined by the then-new strategy of importing into psychology the intellectual resources used in designing information technologies. Whereas Chomsky employed the theory of computations considered in abstraction from the practicalities of their implementation.

Broadbent employed the intellectual resources that are used by communications engineers to negotiate those practicalities.

Information technology was progressing dramatically at the time when Broadbent and Chomsky were writing. It was progressing rapidly, with the invention in September 1958 of the integrated circuit. And it was progressing conspicuously, with the launch of Sputnik, and with the introduction, in December of that year, of subscriber trunk dialing to telephone exchanges in the United Kingdom. Broadbent saw the theoretical resources that were used in developing such communications technologies as a tool that could be used throughout psychology. In the conclusion of *Perception and Communication*, he explicitly presented this as an attack on, and as an alternative to, positivism-influenced behaviorism. But at a much early stage in the discussion, before these broader methodological themes have been broached, he writes:

> Perhaps the point of permanent value which will remain in psychology if the fashion for communication theory wanes, will be the emphasis on problems of *capacity*. [...] The fact that any given channel has a limit is a matter of central importance to communication engineers, and it is correspondingly forced on the attention of psychologists who use their terms. (1958: 5)

This introduction of the notion of capacity limitations into discussions of perception was, as Broadbent predicted, hugely and permanently influential. It was from claims about capacity, thought of in information processing terms, that all theories of attention in the decades following Broadbent would be built.

According to Broadbent's own capacity-based theory of attention there is a single attentional bottleneck at which capacity limitations are especially pertinent, a bottleneck that arises because the information coming in from the senses is processed by two systems operating in series. The first system, Broadbent thought, has a large capacity for information processing. The second has a much smaller capacity. The bottleneck produced by the connection of the two is the locus of attention in the sense that, although all stimuli are automatically subjected to processing by the first, large-capacity system, the stimuli that make it through the bottleneck into the small-capacity system count, ipso facto, as stimuli to which attention is paid.

This two-systems-and-a-bottleneck picture was intended as a communication-theoretic rendering of the everyday idea that simple features of one's environment, such as the fact that there are people talking in the next room, come to one's awareness involuntarily, whereas the details of these things, such as the *content* of the conversation that is taking place, can be detected only for one or two of the things that are going on, with the question of *which* things have their details detected depending on the focus of one's attention.

By introducing the information-theoretic notion of capacity to discussions of perception, Broadbent allowed various theories of attention

to be articulated and debated. The debate between those theories took place in a recognizably Broadbentian idiom until well into the 1980s. But the Broadbentian explanatory framework, and the theoretical skirmish that followed its eventual collapse, did nothing to bring to light the metaphysical issue that had divided James and Bradley. On the contrary, the influence of Broadbent was one of the factors that contributed to that issue's remaining unarticulated. It did so because all of those whose research was in the Broadbentian tradition, whichever side they took in the subsequent debates about the locus of attentional selection, were, metaphysically, on the side of James rather than Bradley: They took it that the explanation of attention should proceed via the explanation and description of the processes of capacity-limitation management, and so, a fortiori, they took it that the explanation of attention should proceed via the identification and description of particular attention-constituting processes. Bradley's claim that we need an alternative to the process-identifying explanatory approach was not considered.

In the case of Broadbent's own theory this allegiance to the Jamesian metaphysical position is especially easy to see. James, as we have said, thought that attention was, on some occasions, constituted by 'the accommodation or adjustment of the sensory organs'. Broadbent's view was that attention is constituted by the adjustment and accommodation of perceptual processing resources that are just two steps farther downstream: Attention for him is the adjustment, not of the sensory organs themselves, but of the resources that process their output. The late selectionists, who were Broadbent's chief rivals, differed only in how far downstream they thought the attention-constituting processes take place. Both camps shared an allegiance to the Jamesian idea that the identification of the attention-constituting process (or of a small number of attention-constituting processes) was the correct explanatory strategy for a theory of attention to take.

Nowhere in the psychological literature of the Broadbent-influenced period do we find the view that we identified in Bradley's early work—the view according to which the attempt to explain attention by identifying its constituent processes is tied up with a false metaphysical assumption. To find that view represented in the mid-twentieth century, we need to look to the philosophical literature.

1.7 HEIRS OF BRADLEY IN THE TWENTIETH CENTURY

I have said that the issue that divided James from Bradley was, although they failed to articulate it, a metaphysical issue appearing in the guise of a dispute about explanatory tactics. Being metaphysical, one might expect this issue to have been a topic of debate among philosophers, but attention was discussed remarkably little by philosophers in the twentieth century. After Broadbent's work the philosophical neglect of attention was owing to the fact that attention had come to be regarded as a topic

for empirical inquiry rather than for a priori philosophizing. Prior to Broadbent the philosophical neglect of attention was owing to the popularity of positivistic and of Wittgensteinian qualms about the explanatory credentials of all inner acts, with attendings being just one example. In 1957, the year before Broadbent's *Perception and Communication* was published, these Wittgensteinian qualms were in evidence in Peter Geach's *Mental Acts*. Geach mentions attention in connection with the explanation of the way in which perception puts one in a position to form a judgment about the content perceived, but he mentions attention only in order to dismiss its explanatory credentials. 'So far as I can see', writes Geach, 'it is quite useless to say the relevant sense-perceptions must be attended to, either this does not give a sufficient condition, or else "attended to" is a mere word for the very relation of judgement to sense perception that requires analysis' (64).

In the context of this Wittgenstein-inspired hostility to internal acts, the metaphysical issue that divided Bradley and James remained absent from the philosophical agenda. There were, however, occasional breaks in this silence on topics related to attention. They can be found in the literature prompted by the discussion of 'heed concepts' in Ryle's 1949 *The Concept of Mind*. The most sustained treatment of attention in this period is Alan White's 1964 monograph *Attention*.

White shared Ryle's sense that a straightforward behaviorist treatment of 'heed concepts' was unsatisfactory, and he thought—as Ryle himself may have done in later years—that the more sophisticated behaviourist treatment offered in *The Concept of Mind* failed to address these worries (see Ryle 1971, viii). White also shared Ryle's enthusiasm for the project of extracting philosophical lessons from the norms governing discourse in ordinary language. This can sometimes disguise the depth of White's insight. When we find him taking pains over points like the following, his philosophy can sometimes sound like a rather uninformative grammar lesson:

> When we say of someone that he noticed what he or another was doing, the 'what' is an interrogative pronoun because 'noticing' is here an instance of 'noticing that'. By contrast, the 'what' of attending to what oneself or someone else is doing is a relative pronoun meaning 'that which' he is doing. (1964: 18)

Current philosophers tend to regard this fixation on natural language as a phase that philosophy did well to get out of, and understandably so, but the bad reputation of ordinary language philosophy is in some ways undeserved. White knew perfectly well that our philosophical theory of attention should tell us about attention itself, and not just about the rules governing our talk about it. His discussion of the grammar of attention talk was not intended as an end in itself. It was intended to enable the diagnosis of fallacies in the arguments about the phenomenon's underlying nature.

Among the lessons that White wanted to draw from his examination of the behavior of 'heed concepts' was a lesson about the way in which Ryle's treatment of those concepts needed to be modified. Ryle had treated heed concepts as belonging in the class that he dubbed 'mongrel categoricals' (1949: 135–138). By this he meant that statements employing heed concepts not only tell us *what* is taking place, but also situate that event relative to a set of dispositions and hypotheticals. Ryle provides some examples that make the point clear. 'That bird is migrating' is one of his paradigm cases:

> The description of a bird as migrating has a greater complexity than the description of it as flying in the direction of Africa, but this greater complexity does not consist in its narrating a larger number of incidents. Only one thing need be going on, namely, that the bird be at a particular moment flying south. 'It is migrating' tells not more stories, but a more pregnant story. (136)

Ryle's theory is that 'he is attending to what he is doing', like 'it is migrating', tells a pregnant story in the sense that it gives us hypothetical information, about what might have been the case, along with descriptive information, about what actually is the case. The hypothetical information that it gives is information about what the attentive man does typically, or about what he would have done in similar but slightly different situations.

White rejected Ryle's idea that 'in playing the piano, he is attending' was a mongrel categorical of this sort. His reason, which we consider in more detail in chapter 4, was that 'it is migrating' can serve as an explanation of 'it is flying south', whereas 'he is attending' cannot explain the fact that he is playing the piano. At most, it explains a different fact: that his piano playing is successful. Describing the bird's flight as an instance of migration provides us with information that zooms out and locates the flight in a broader pattern of dispositions that the bird, and birds like it, displays. Describing the pianist's playing as an instance of attention, by contrast, zooms in and tells us more about the way in which the playing is taking place. As White puts it: 'Whereas "He is practising on the piano" gives a more complex narration of the same incident as that narrated by "He is playing the piano". "He is attending to what he is playing on the piano" narrates a more complex incident' (1964:14).

Ryle's and White's preference for talking in formal mode, about *concepts* and *sentences* rather than things in themselves, is, on this occasion, merely an expository technique. When translated into the material mode White's claim is recognizable as a metaphysical one. It is the claim that the metaphysical relationship between attending and the activities that are performed attentively must be different in kind from the metaphysical relationship between migrating and the flights that are instances of it.

The alternative picture, with which White wants to replace Ryle's mongrel categorical account, is a picture that is close kin to the picture

found in Bradley. Bradley, as we have seen, rejected the idea that identifying the attention-constituting processes gave us what we need in order to know what attention is. He thought that attention was constituted by the processes of 'redintegration' and 'blending', but he thought that this fact was of no explanatory consequence, since a catalog of attention-constituting processes, like the catalog of employment-constituting activities, is the wrong form for an explanation of attention to take. In White's work, the idea that the explanation of attention cannot proceed by identifying *which* processes take place becomes the claim that 'attention' 'does not name any specific activity; it indicates the circumstances in which the activity occurs and thus signifies what, on this occasion, it amounts to or is a form of' (1964: 6).

White and Bradley are, then, in broad agreement about the negative claim—that attention is not explicable by the identification of its constituent processes. They also offer something broadly similar by way of a positive alternative. White spells it out as follows:

> Simply to say that someone is attending, or paying attention, gives us no more clue as to what activities he is engaged in than simply to say that he is practising. What 'attending' tells us is that his activities and energies, whatever they are, are directed to and focused on something which occupies him. (1964: 7)

For Bradley and White, and in a slightly different way for Ryle, claims about attention are not made true simply by the facts about *which* processes are taking place in the attentive thinker. In Bradley's treatment this is because claims about attention tell us, not about which processes are taking place, but about their immediate causal context: The attention-constituting processes are those that are 'prompted by interest' and that 'bring about engrossment' (1886: 316). In Ryle's treatment it is because claims about attention tell us something about processes and also tell us something hypothetical: Intellectual processes constitute attention when they occur in a context such that similar processes would have taken place in a range of counterfactual situations (1949: 135–136). In White's treatment, the idea is that claims about attention do not tell us which processes are taking place. Instead they tell us how those processes relate to the agent's other activities and to his goals.

A theory like Bradley's or White's (or Ryle's) has different explanatory goals and operates at a different level from a theory like Broadbent's, but this should not be taken as an indication that the theories are not in conflict. Although theories at different levels of explanation need not *compete*, this does not mean that they never exclude one another. There is a genuine disagreement between a theory like Broadbent's and a theory like White's. It is a disagreement over the fundamental metaphysical/explanatory question that divided Bradley and James. White, like Bradley, takes it that the identification of processes at the subpersonal level is the wrong sort of thing to provide an explanation of attention.

Broadbent, like James, attempts to explain attention by just such an identification.

We saw above that Bradley and James lacked the vocabulary in which to articulate this disagreement. When White and Broadbent were disagreeing over this same issue the reasons why the metaphysical basis of their disagreement went unarticulated had more to do with the fragmentation of scientific and philosophical attempts to account for the mental. For these various reasons, the issue underlying these fundamental differences of explanatory approach remains one that has never been brought into focus as a topic for debate. Our analogy with employment has given us a glimpse of what that issue might be. Chapter 2 articulates it.