

Cartesian ‘Ideas’ and the First (C17th) Cognitive Revolution

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Abstract

Jerry Fodor (2003) sees Hume’s *Treatise* as the foundational document of cognitive science, though he concedes that “Descartes got there first.” However, Hume’s “Cartesianism” is an ambiguous inheritance since Hume’s representational account (and Fodor’s) is closer to Malebranche’s version than Descartes’ own. Descartes shared the ‘pragmatism’ and ‘direct realism’ of Arnauld and later Reid – the doctrine that Fodor sees as “the defining catastrophe” in recent philosophy of mind. Since Putnam (1999) and others defend this Arnauld-Reid view today, there has been less progress since the 17th Century than Fodor suggests. I defend Descartes’ conception of representation against misunderstandings that illuminate issues still at the forefront of debate in cognitive science today. For example, despite the wide currency of Dennett’s term, Descartes was not guilty of the ‘Cartesian Theater’ fallacy and, indeed, in his *Dioptrics* explicitly argued against a conception of representation that would require the notorious homunculus – in the Malebranchian Theater.

Not Much of a Revolution?

Jerry Fodor (2003, 2) notes that a shift in philosophical fashions has permitted appreciating Hume more as a psychologist than as a philosopher in the traditional sense concerned with ‘conceptual analysis.’ However, Hume is neither alone, nor the most aggrieved victim of such ‘whig’ history. Notably, Descartes’ work is best seen “as the output of a practicing scientist who, somewhat unfortunately wrote a few short and relatively unimportant philosophical essays” (Clark 1982, 2). This can’t be said of Hume. Aside from his physics, Descartes’ neuroscience in *Optics* and *Treatise of Man* were of staggering originality, right in their fundamentals, and still a corrective to widely held theories such as pictorial accounts of imagery. It is in this light that we may appreciate Chomsky’s doubts concerning the radical novelty of the ‘cognitive revolution’ and his remark “it wasn’t all that much of a revolution in my opinion” (1966, 1). He notes that the same convergence of disciplinary interests had taken place in the seventeenth century in what he calls the “first cognitive revolution, perhaps the only real one.” Chomsky adds:

... the second cognitive revolution has rediscovered, reformulated, and to some extent addressed some of the most venerable themes of our cultural tradition, back to its early origins. (1966, 11)

Descartes’ Startling Reverse Sign

In Yolton’s (1996) view, Descartes is to be credited with having introduced an entirely novel and remarkable doctrine

of mental representation. Noting that it has received very little attention, Yolton characterizes this signficatory relation as a “curious” and “somewhat obscure” doctrine which turns the conventional account on its head (1996, 73). Yolton writes:

Descartes’s account of physical motions as signs is such a startling notion that one wonders about its antecedents. Philosophers before Descartes talked of signs, but I am not aware of any who reversed the normal sign relation. (1996, 190)

In his chapter on ‘The Semantic Relation,’ Yolton reports Descartes’ account of perception in *Le Monde*, taken to illustrate this “second interactive relation, the semantic or signficatory relation.” Yolton distinguished this from the more familiar representative relation between an idea and its object, that is, the standard conception of intentionality associated with the sense and reference of symbols. In explaining the novel conception, Yolton cites Descartes’ comparison of this new natural reverse-sign relation with the way in which tears and smiles convey sadness and joy, the point being that in both cases the signs perform their function despite failing to resemble that which they signify. Yolton says of Descartes suggestion:

... it is a reversal of what we might expect. The expectation from what Descartes has been saying is that ideas or sensations are going to be signs; thus, the sensations of light would be a sign of specific motions in the object and air. His problem would accordingly be to explain how we can get information about the world from our ideas and sensations. But the sign relation here suggested is the other way around: the physical motion is the sign *of or for* the sensation. (1996, 186)

Yolton explains that, on this view, “The physical stimulus signifies the idea” (1996, 186) instead of the other way around as we should expect. Yolton follows Alquié, suggesting that “it is clear” that for Descartes “the physical action of light signifies to us the sensation that we feel” and, therefore, in Alquié’s words, “that which we habitually consider as the signified (the physical action) becomes here that which signifies” (Yolton 1996, 186). This is, then, the reverse sign relation which Yolton takes Descartes to be offering as a radically novel account of mental representation.

However, the very features which make this such a “startling” view are, at the same time, grounds for being cautious about attributing it to Descartes. That is, what makes the doctrine startling is *ipso facto* what makes it implausible as an account of the phenomenon and also, consequently, as an account of Descartes’ intentions. Textual support for Yolton’s reverse-sign interpretation is hardly compelling. Using the term ‘sign’ exclusively for Descartes’ novel

conception, Yolton explains the point of the reverse-sign relation by saying that this new signficatory relation “replaces the *causal* relation between physical motion and ideas, but the *representing* relation goes, as it were, outward from awareness” (1996, 190). In this sense, then, “ideas are not signs of things: they are the interpretations of physical motion (of things)” (1996, 190). Thus Yolton says that the cognitive, interpretative function of ideas and sensations is representation, presumably in the more familiar sense, and not *signification*, which is reserved for the reverse-sign relation.

I believe that this entire scheme is unnecessarily confusing in ways which may be overcome when we recognize Descartes as striving to resolve perplexities which still bedevil debate on representation. I will suggest that Yolton has perhaps not gone far enough in the direction which his own analysis dictates. Ironically, Yolton’s analyses of the history of the ‘idea’ idea show the way to clarification of the obscurities attending his own account of the reverse-sign relation. Specifically, I will suggest that Yolton relies on a notoriously vexed tripartite notion of representation as a relation between referent, representation and agent (Slezak 2002), but, at the same time, recognizes its problems and elucidates important alternatives to it. In other words, the very notion of a “reverse-sign” relation preserves a certain problematic conception of representation whereas, arguably, Descartes’ intention is precisely to articulate an alternative. Yolton himself clearly indicates this crucial insight where he explains that “knowing (perceiving) is not reading off from our sensory or perceptual experiences properties of the world, Perceptual knowing is the having of these experiences” (1996, 190).

I believe that this is the key to the puzzles of representation from Descartes’ time to our own. It is the Arnauldian direct realist view of perception as a cognitive process rather than as involving access to intermediate objects. Yolton appears sympathetic to this view, but seems reluctant to embrace it fully for reasons that have motivated philosophers from Malebranche to Fodor. The purely causal mechanical sensory processes on their own seem unable to explain the semantic, intentional aspects of meaningful experience.

“Dumb Signs Made in the Brain”

Yolton cites 17th Century Joseph Glanvill among the very few writers who explicitly use the same notion of a reverse-sign relation to answer the question “how the pure mind can receive information from that, which is not in the least like itself” (1996, 191). Glanvill’s characterization of the problem is striking to modern readers through its precise anticipation of the notorious ‘Chinese Room’ conundrum of John Searle (1980). For Searle, the purely syntactic, causal processes of computational mechanisms are insufficient to explain meaningful properties of mental representations. Computational symbols are like the meaningless squiggles of Chinese characters to an English speaker. Thus, in the 17th Century, Cudworth, too, was concerned precisely to explain how ideas arise from “dumb Signs made in the Brain” (1996, 192). Yolton reports Glanvill’s question which echoes Searle’s worry: “But how is it, and by what Art doth the soul

read that such an image or stroke in matter ... signifies such an object?” since

... without “some unknown way of learning by them [the motions of the filaments of nerves] the quality of the Objects,” the soul would be like an infant who hears sounds or sees lips move but has no understanding of what the sounds of movements signify, or like an illiterate person sees letters but “knows not what they mean.” (1996, 191)

Yolton argues that Descartes offers his reverse-sign relation as a non-causal alternative to the usual semantic connection between ideas and their referents in the world:

The stress on meaning in perception, especially the suggestion of motion being a natural sign for the mind, enables Descartes to replace the causal connection between felt experience and physical motion: motion in body does not cause but it signifies our sensations. Is there more to this distinction than just the convenience of a substitute relation for causation? Is there ... an explication of natural signification? (1996, 187)

Yolton takes Descartes to be substituting the reverse signification relation in place of the causal connection between motion and sensation. However, this appears to be a strained reading of the texts that would not independently suggest such a construal. It seems that Yolton shares the widespread discomfort with purely causal processes and seeks to supplement these with some additional mechanism. However, the texts cited by Yolton as evidence for a non-causal reading of the sign relation are most naturally interpreted as straightforwardly causal. Certainly Descartes’ use of the word ‘sign’ to capture his notion is insufficient warrant for positing a semantic rather than a causal process. The connotations of the term are presumably wide enough to permit a purely mechanical, non-intentional conception. Indeed, in support of his account Yolton cites passages from the *Sixth Meditation* and *The Passions of the Soul* which both explicitly refer to causation (1996, 187). Another passage cited from *Le Monde* is also taken by Yolton, following Alquié, to support a reverse-sign interpretation, but here Descartes speaks of the way in which words “make us conceive of things” which is more plausibly taken as a causal claim than as a denial of it. Moreover, later in his chapter on the semantic relation, Yolton amply acknowledges that “Descartes does frequently use the language of causation (produce, excite) when talking about some sensory awareness” (1996, 202), and he enumerates several examples from Descartes’ texts. On Yolton’s own evidence, then, it seems difficult to sustain his substitutional, non-causal attribution to Descartes. Indeed, Yolton can only support his account by ascribing a certain degree of inconsistency to Descartes (1996, 203), but the need for such uncharitability in addition to the strained reading of the texts is perhaps a symptom of missing Descartes’ point.

Moreover, these purely textual infelicities are likely to be a reflection of what is, on independent philosophical grounds, an unsatisfactory account of Descartes’ intentions. Yolton’s characterization of Descartes’ doctrine as an unprecedented and “startling” one is perhaps another way of saying that it is

intrinsically implausible as a solution to the problems in question. *Ceteris paribus*, we should prefer a less extraordinary account.

The “obscure” and “curious” doctrine

Yolton (1996, 187) suggests that a particular passage in the *Sixth Meditation* is one “where Descartes uses ‘sign’ in this way” - namely in a reversal of the usual case, so that here “The physical stimulus signifies the idea”. Yolton says that Descartes’s suggestion of motion as a natural sign “enables Descartes to replace the causal connection between felt experience and physical motion: motion in body does not cause but it signifies our sensations”. It is conceivable that, taken on its own out of context, Descartes’s use of the term “signal” (1985 ii, 60) might be construed to mean a sign in Yolton’s reversed semantic sense, but the overall discussion in which this occurrence is found leaves little doubt about Descartes’s meaning as ordinary causation. In the selected passage quoted by Yolton (1996, 187), Descartes is speaking of the mechanisms by which the nerves convey information about pain from the limbs such as the foot:

... when the nerves in the foot are set in motion in a violent and unusual manner, this motion, by way of the spinal cord, reaches the inner parts of the brain, and there gives the mind its signal for having a certain sensation, namely the sensation of a pain as occurring in the foot. (Descartes 1985 ii, 60)

This passage comes towards the end of an extended discussion of the manner in which the nerves conduct pain by movement exactly the same way that a piece of string can be pulled at one end to effect movement at the other. Just as in the case of a piece of string, movement of intermediate parts if pulled will have the same effect on the extremity. These passages preceding the one quoted by Yolton leave no doubt that Descartes is concerned with strict causes and effects in a perfectly ordinary sense:

In a similar fashion, when I feel a pain in my foot, physiology tells me that this happens by means of nerves distributed throughout the foot, and that these nerves are like cords which go from the foot right up to the brain. When the nerves are pulled in the foot, they in turn pull on inner parts of the brain to which they are attached, and produce a certain motion in them; and nature has laid it down that this motion should produce in the mind a sensation of pain, as occurring in the foot. (Descartes 1985 ii, 60)

It is important to notice here that Descartes is concerned precisely with the doctrine of natural signs of interest to Yolton. The analogy of motion in the nerves with pulling on cords makes it clear that Descartes sees the signal in question as a cause whose effects are the sensations in question. The idea that when nerves are pulled “they in turn pull on inner parts of the brain” is evidently a causal sequence of events and, accordingly, the “signal” in the passage quoted by Yolton means the causal effect of motions in the nerves. Of course, Yolton acknowledges Descartes’s commitment to the causal sequence of events, but argues that Descartes’s was also proposing an additional kind of relation. Thus, he says

“There are two reactions operating in perception: the causal, physiological reaction and the signification reaction” (1996, 74):

What is important about this doctrine is the indication it gives of Descartes’s effort to preserve an interaction between body and mind which is not causal, or which is more than causal. The two languages that he employs reinforce this suggestion: he recognized the causal relation between physical objects and the body, but he also recognized that that causal relation is inadequate for cognition. For the latter, a different, noncausal but still interactive relation is needed. (1996, 73,4)

On the contrary, however, it seems that Descartes can be understood as suggesting that the causal relation *is* adequate for cognition and constituted by it. Yolton explains further that “The reaction to these signs is cognitive, not physiological, but it does work in tandem with the physical and physiological reactions” (1996, 73). Thus, we see Yolton attempt to explicate what he concedes to be a “curious” and “somewhat obscure” doctrine and one to which very little attention has been paid. Furthermore, Yolton, says “I suspect it must be present in other writers as well, but so far I have not discovered other occurrences of it” (1996, 73). Of course, these facts permit a different interpretation: the obscurity of the doctrine may be less due to Descartes than to Yolton. Relatedly, its absence in other writers and lack of scholarly attention may not be a failure to notice something, but rather due to its non-existence.

In support of his reverse-sign account, Yolton makes a further appeal to a passage from *The Passions of the Soul*, but this hardly supports Yolton’s case any better than the texts we have seen, since it is also concerned with the mechanical workings of the nerves through spirits and pores. The very sentence quoted by Yolton is more naturally construed as offering a causal sequence in which, he says, the animal spirits enter certain pores in the brain and there excite “a particular movement in this gland which is instituted by nature in order to cause the soul to be sensible of this passion” (1996, 187).

Other crucial texts cited by Yolton include the *Dioptrics* and the *Traité de l’homme*, but these do not appear to support the reverse-sign interpretation on their own without contrivance. In the *Traité*, Descartes’s model is perhaps most notable precisely for the rigour with which it attempts to explain mental phenomena in terms of mechanical processes. Of course, his need to resort ultimately to a rational soul makes sense from an explanatory point of view because of the limitations on such mechanisms to account for those special features of mind such as language and knowledge which rightly appeared to Descartes to transcend purely mechanical means, as this was understood in the 17th Century. However, the joining of a rational soul to this machine does not appear to bear directly on the supposed reverse-sign relation which concerns only the ontological realm of *res extensa* prior to the final effects of the filaments and pores on the *res cogitans*. In the *Traité*, then, we see an unproblematic causal sequence closely related to the other example cited by Yolton and famously illustrated by the boy whose foot touches a fire.

Here Descartes explains in precisely the same terms we have seen in the *Sixth Meditation*:

Thus, if fire A is near foot B, the particles of this fire (which move very quickly, as you know) have force enough to displace the area of skin that they touch; and thus pulling the little thread *cc*, which you see to be attached there, they simultaneously open the entrance to the pore [or conduit] *de* where this thread terminates [in the brain]: just as, pulling on one end of a cord, one simultaneously rings a bell which hangs at the opposite end. (T.S. Hall, transl.1972, 34)

Hume's Problem: Representations to Understand Themselves

There can be little doubt about the straightforwardly causal nature of the sequence which Descartes is postulating. The need to superimpose any additional signficatory features appears to arise from extraneous theoretical preconceptions rather than from anything evident in Descartes's text. Specifically, it seems likely that the usual intentional connotations of the term 'sign' may induce us to read some representational meaning into Descartes's account, whereas I believe his concern is quite different. Undeniably, to speak of a sign may convey a notion of symbolic representation, but I believe that this is precisely the notion which is the source of the perennial difficulty which Yolton elsewhere actually does so much to clarify and dispel. The point is perhaps made most clearly by Dennett (1978) in his review of Fodor's (1975) *Language of Thought*. Dennett refers to it as Hume's Problem which arises because "nothing is intrinsically a representation of anything; something is a representation only for or to someone". In attempting to understand Yolton's analysis, it is revealing that he expresses his notion of signification in exactly these terms, saying of his reverse-sign relation "A sign stands for something else. It requires an interpreter; that is, a sign is a sign of something for someone" (1996, 208). However, Dennett explains:

Hume wisely shunned the notion of an inner self that would intelligently manipulate the ideas and impressions, but this left him with the necessity of getting the ideas to "think for themselves" ... Fodor's analogous problem is to get the internal representations to "understand themselves". (1978, 101)

Now, Yolton clearly acknowledges that physical motions in the brain do not have an interpreter in the usual sense, and recognizes Descartes's appreciation of this point, saying "I think it incorrect to say that Descartes turned the mind into a quasi person or second perceiver" (1996, 209). However, notwithstanding this acknowledgement, Yolton still maintains the appropriateness of such a signficatory relation to explain Descartes's view, saying:

Nevertheless, in these passages, Descartes is trying to assimilate physiological notions to natural signs, even though the signfication relation in this case is not one of which we are aware. He is searching for an alternative to a causal relation. (1996, 209)

In this way, Yolton tries to have it both ways, that is, to have a semantic, signficatory relation while, at the same time, denying the agent or interpreter for whom the sign serves to refer. This seems unsatisfactory on philosophical and exegetical grounds which are both satisfied by dropping the attribution of non-causal, reverse-sign semantic relation in addition to the usual representational one. That is, Descartes is not searching for an *alternative* to a causal relation as Yolton suggests but, rather, he *identifies* the representational abilities of the mind with causal relations which are supposed to "understand themselves".

Descartes may be understood as proposing an account precisely of the kind Dennett suggests is needed. This reading of Descartes is strongly supported by the fact that his account of visual images in the *Dioptrics* is exactly of this sort: in this case, the images, so to speak, see themselves. It is in this sense that we are to understand Descartes's argument against resemblance: Visual representations are not to be conceived on the model of our external pictures which resemble their referent, since this would require that they be seen by someone. Instead, it is sufficient if the images encode the relevant information about the physical objects. My suggestion is that it is such a notion of encoding which best captures Descartes's concept of the sign relation. There are ample texts including especially the *Traité de l'homme* and *Dioptrics* in which it is clear that Descartes's account of visual perception involves the transmission of such signals along the nerves from the retina to the brain in what is essentially a correct account of the encoding of information in the modern sense¹. Descartes's speculations are not only correct but an insightful solution to the problem of imagery which precisely anticipates Pylyshyn's (2003) responses to pictorial theories of visual images (see Slezak, 1995). Of course, Descartes' sense of encoding is one in which the symbols are intrinsically meaningless, hence, giving rise to the philosophical anxieties which have preoccupied philosophers from Descartes's time to our own, as Yolton has shown. The dilemma is that, if the representations are meaningful, then they appear to intervene between the mind and the world precluding a direct realism, whereas if they are meaningless they appear unable to do the job. Since Yolton takes Descartes to be seeking a direct realism, it makes sense that Descartes should avoid the triadic schema which entails meaningful intermediary entities, just as Yolton's Arnauldian account itself suggests.

To help clarify Descartes's surprising and puzzling conception, Yolton (1996, 186) suggests that Descartes appears to distinguish signifying from representing, but a few pages later, Yolton (1996, 190) avers that "Perhaps the distinction between signifying and representing is not entirely clear" and may perhaps be best understood in terms of the two directions in which the relation between object and its symbol may be connected:

¹ It is difficult to see why A. W. MacKenzie (generously praised by Yolton) should write disparagingly of Descartes's speculations about the mechanisms of sensory perception as "often quite uncontrolled" and "Particularly uncontrolled are his speculations about neuromechanics" (1989, 136).

If there is a difference, perhaps we can say that the signifying relation replaces the causal relation between physical motion and ideas, but the representing relation goes, as it were, outward from awareness. (1996, 190)

Yolton's analysis here is illuminating, though inevitably retaining an air of paradox, as he concedes in occasional *obiter dicta*. Thus, as we have seen, he says that the distinction between signifying and representing remains unclear and that "This signifiatory relation is somewhat obscure in Descartes's brief use of it." (1996, 73). These remarks suggest that on Yolton's own account Descartes's doctrine remains somewhat puzzling.

Non-Mechanistic, Non-Naturalistic Relation?

There is room for considerable uncertainty about Descartes's intentions in what Yolton describes as "those cryptic sign passages" (1996, 199). Nevertheless, there is a danger of overstating the extent to which Descartes is concerned with two different, though related, processes. Thus, in suggesting a "second, nonmechanistic, interaction between brain and mind" (1996, 198), Yolton appeals to writers who take a somewhat extreme and implausible non-naturalistic, metaphysical position according to which Yolton says "What science cannot do is to 'explain how bodily states and processes become experiences'" (1996, 200, 218 fn). Yolton appears to endorse the view of these authors who suggest that we must take "semantic presence as a basic category, just as existence is a basic category" (1996, 200). Yolton invokes the ideas of J.S. Kelly and E.M. Adams "not because they speak directly to issues in Descartes, but because they make use of concepts very similar to those employed by Descartes" (1996, 199). Yolton acknowledges that the views in question take the semantic relation to be "nonnatural" and transcending what is scientifically explicable. However, in view of Descartes's thoroughgoing, strenuous naturalism, this seems to be a desperate move, and the doctrines are unlikely to be "very similar to those employed by Descartes". It must be acknowledged that the issues at stake are profoundly difficult and recalcitrant - still the subject of considerable perplexity². However, the persistent intractability of the problem is not favourable to a reconstruction of Descartes in terms of such occult notions as "semantic presence as a basic category," though it must be admitted that Fodor's (1994, 2003) metaphysical mind-world semantic relation is no less obscure.

Thus, Yolton rejects identifying the mechanical-causal processes with the signifiatory relation in favour of two independent functions:

I have been suggesting that brain motions play two roles, one responding to physical motions coming from the environment, the other triggering conscious reactions in perceivers. (1996, 198)

Significantly, however, Yolton concedes the obscurity of the analysis, admitting that his account leaves Descartes doctrine somewhat opaque:

² Fodor says "of the semanticity of mental representations we have, as things now stand, no adequate account" (1985, 28).

This latter role *is* far from clear, and its intelligibility *is* in doubt, but its importance lies in its suggestion of two interacting relations between perceivers and external objects. (1996, 198)

Yolton cites Gaukroger's (1996) analysis of Descartes's doctrine of signs in support of his own account, drawing attention to Gaukroger's emphasis on the distinction between causal and semantic aspects of Descartes's doctrine. Yolton does record Gaukroger's concern to "resist saying that there are two processes" but nevertheless emphasizes his analysis of *Le Monde* and the *differences* between this and the *Regulae* account of causes. To be sure, in *Le Monde* Descartes does not explicitly speak of sequential causal mechanisms as he does elsewhere when describing the effects of bodily movements through the fibres etc. However, it does not follow from this absence that Descartes is making a contrast with the causal account. The absence of any causal explanation may be explained in an obvious way - namely, that Descartes is concerned with a significantly different point - explaining why resemblance is neither necessary nor sufficient for representation.

In the end, ironically, it seems that Yolton embraces a dual process account precisely because he wishes to avoid the implication of an intelligent or conscious "code reader" which he takes to be a consequence of brain motions giving rise to perceptual recognition.

Certainly, our normal use of signs is in the context of conscious interpretation of the signs, but it does not seem to me that that is what Descartes was suggesting. Therein, of course, lies the difficulty of making sense of Descartes's notion of the mind reacting to brain motions as signs. To read the signs or codes presented by the brain would seem to require the mind to scan the motions in the brain ... (1996, 198)

Yolton's position here appears paradoxical for he seems to reject a conception of "the brain presenting certain motions for the mind's attention" because of the implication of a code-reading homunculus. However, he avoids this notorious difficulty by resorting to the dual process account rather than the obvious alternative - namely, a unitary, formal, causal-mechanical one. That is, Yolton appears to think that his semantic account does not fall victim to the familiar explanatory regress despite admittedly invoking precisely the kind of semantic relation which leads to the problem. He says "I do not find it obvious that the few passages suggesting that the mind reacts to brain motions as signs is the same as the brain *presenting* certain motions for the mind's attention" (1996, 198). That is, Yolton clearly recognizes the need to avoid the interpreting homunculus but, at the same time, embraces a semantic relation which invites it. As we have noted, Yolton concedes that his resolution of this tension by positing dual roles for brain motions is unsatisfactory. Of course, the question is whether these doubts about the clarity and intelligibility of the doctrine are to be blamed on Descartes's doctrine as such or on the reverse-sign reconstruction of it.

The puzzle of meaning for mental representations is undeniably a real one and, indeed, remains notoriously unclear to this day. However, the interest and importance of

Descartes's writing on the subject is to be seen in its offering a solution to the vexed question which is as relevant today as in his own time. Descartes is evidently to be classed among those who advocate a syntactic, mechanical and purely formal account of mental representation akin to today's 'conceptual role' and 'narrow content' semantics. The point of the oft-quoted passages from *Le Monde* and *Dioptrics* is to argue that once resemblance is abandoned as the basis for representation, anything which functions to convey the appropriate information about the physical world suffices to constitute the semantic relation between ideas and their referents. Given such a functional conception, there is no need to suppose Descartes to have substituted a secondary, novel semantic relation for the causal link between brain motions and ideas since the brain motions are supposed to *constitute* the ordinary representational relation via their abstract encoding of information. Thus, despite offering the most important clarifications of these questions, Yolton himself seems to be to some extent under the influence of certain problematic assumptions. If it were not for these, there would appear to be little incentive to read Descartes as offering anything other than a straightforward causal story about the origins of sensation in the bodily movements of filaments, pores and animal spirits. That these are not thought to suffice as explanations of conscious experience is a reflection of the deep-seated difficulty which continues to plague the subject.

Where Philosophy Goes When It Dies

Stephen Gaukroger (1996) has described as a "pointless exercise" the efforts to show the extent to which Descartes, for example, was a precursor of modern cognitive science. However, noting anticipations of current theories is likely to be revealing in both directions: Like Brook's (1994) exemplary work *Kant and the Mind*, study of precursors of cognitive science provide an independent, extensive source of insight into contemporary problems and, conversely, are themselves illuminated in novel ways unavailable to traditional scholarship. In a different context, Jerry Fodor has noted a tendency of modern psychology to revive notorious classical doctrines. In a characteristically acerbic quip he says "Cognitive science is where philosophy goes when it dies" (1994, 110). In this regard, Arnauld was evidently correct in remarking that "they stray furthest who move the fastest" (1683).

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