Memes, Minds and Evolution

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It is common in the history of science to try to extend an idea first demonstrated in one domain into others. Sometimes the extension is literal, and sometimes it is frankly metaphorical. Sometimes, however, when an extension is claimed to be literal, it is far from easy to see that it is. If an extension does not make use of entities and mechanisms involved in the original domain, and introduces novel entities and mechanisms, then it is not unreasonable to doubt the claim of its authors that it is a literal extension of a well-established theory. It is, therefore, not surprising that many who accept that the cultural transmission of information is unique to our species nevertheless balk at Dawkins's and Dennett's contention that there are units of cultural evolution, called 'memes', which can be used to explain the development and diversity of human culture, and whose survival is explicable in terms of Darwin's theory of evolution by natural selection.[1] Our aim in this paper is to argue that scepticism about Dawkins's and Dennett's proposal is indeed justified; though it of course does not follow that there is not another way of explaining human culture in evolutionary terms.

I. The Proposal

Dawkins, who has argued that all forms of life have evolved as a result of the differential survival of genes, was the originator of the idea:

> The gene, the DNA molecule, happens to be the replicating entity which prevails on our planet. There may be others. If there are, provided certain other conditions are met, they will almost inevitably tend to become the basis for an evolutionary process. ... I think that a new kind of replicator has recently emerged on this very planet. It is staring us in the face.[2]

[1] R. Dawkins, *The Selfish Gene* (Oxford University Press, 1976); D. C. Dennett, 'Memes and the Exploitation of Imagination', *The Journal of Aesthetics and Art Criticism*, (48:2 Spring 1990), 127–35; and D. C. Dennett, *Darwin's Dangerous Idea* (Allen Lane: The Penguin Press, 1995).

[2] Op. cit., note 1, 206.

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These new replicators Dawkins called 'memes', which he described as units of cultural transmission: 'Examples of memes are tunes, ideas, catch-phrases, clothes fashions, ways of making pots or of building arches. Just as genes propagate themselves in the gene pool by leaping from body to body via sperm or eggs, so memes propagate themselves by leaping from brain to brain via a process which, in the broad sense, can be called imitation'.[3]

Dawkins, however, later expressed caution about his proposal suggesting that 'its main value may lie not so much in helping us to understand human culture as in sharpening our perception of genetic natural selection'.[4] The leading defender of the proposal since then has been Dennett,[5] and it is his account that we will focus on.

It is important to remember that Dennett is deeply committed to the gene-centred interpretation of evolution by natural selection defended by Dawkins. Essentially this recognizes only replicators (genes), which compete for survival, and their vehicles (the organisms they inhabit). Genes need to inhabit organisms to survive, but it is a fundamental point that competition to reproduce is between the former not the latter. Hence, the success or failure of organisms to reproduce is to be explained reductively in terms of that of genes. In a strictly analogous way, the theory of memes recognizes only two sorts of entities, replicators (memes) and their hosts (the minds they inhabit).[6] Moreover, explanations of features of the latter are to be given in terms of the former, so that, as Dennett puts it, 'A scholar is just a library's way of making another library'.[7] This is a bold thesis, particularly if, as Dennett goes on to claim, the laws of natural selection apply to meme evolution literally and strictly, and not metaphorically. But how can they work on such disparate subject matters?

[3] Ibid.

[4] R. Dawkins, *The Extended Phenotype* (Oxford University Press), 112. This caution is less in evidence in his most recent work *Unweaving the Rainbow* (Allen Lane: The Penguin Press, 1998), 302ff.

[5] But see also Susan Blackmore, *The Meme Machine*, (Oxford: Oxford University Press, 1999); R. Brodie, *Virus of the Mind: The new science of the mind* (Seattle, W.A.: Integral Press 1996); A. Lynch, *Thought Contagion: How beliefs spread through society—the new science of memes* (New York: Basic Books, 1996).

[6] These are the bare bones of the two theories. An asymmetry is introduced because memes need human brains (a biological product), whereas genes have no need for them. The causal basis of genes in DNA, and the realization of memes in their own 'vehicles' such as inscriptions, lie outside the scope of these formal theories.

[7] D. C. Dennett, *Darwin's Dangerous Idea* (Allen Lane: The Penguin Press, 1995), 346.

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This is possible, Dennett argues, because evolution is substrate-neutral. It is the case that the information conveyed by genes is embodied in DNA, but evolution by natural selection would have worked just as well if its chemical substrate had been different. The important thing to see, therefore, is that the evolutionary process is an algorithmic one, which applies to more or less anything provided that certain conditions obtain. These are:

(1) variation: there is a continuing abundance of different elements
(2) heredity or replication: the elements have the capacity to create copies or replicas of themselves
(3) differential "fitness": the number of copies of an element that are created in a given time varies, depending on interactions between the features of that element and features of the environment in which it persists.[8]

So provided that memes have these features, the processes of natural selection will kick in.

To evaluate this argument in detail we need first to explain the status of memes, and then to draw attention to a number of ways in which the theory needs to be expanded or clarified. We shall then be in position to see just how ambitious Dennett's theory is, and the extent to which it falls short of that ambition.

II. A Preliminary Clarification of 'meme'

Though memes are ideas, the theory of memes is not a version of British empiricism. Memes are *not* simple ideas, but 'the sort of complex ideas that form themselves into *distinct memorable units*'.[9] The examples that Dennett gives are, however, very various, including the ideas of

arch
wheel
wearing clothes
vendetta
right triangle
alphabet
calendar
the *Odyssey*

[8] Op. cit., note 7, 343.
[9] Op. cit., note 7, 344.

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calculus
chess
perspective drawing
evolution by natural selection
impressionism
'Greensleeves'
deconstructionism

For completeness recall also Dawkins's examples of memes, which has some overlap with Dennett's list, and which includes 'tunes, ideas, catch-phrases, clothes fashions, ways of making pots or building arches'.

a. *Canonical features*

What the members of this somewhat heterogeneous list have in common is the fact that they 'are the smallest elements that replicate themselves with reliability and fecundity'.[10] Given this definition, we should not be surprised to find that they are of different degrees of complexity. They also have a unique association with us, in that their evolution could not have started until a species was created, namely, '*Homo sapiens*—with brains that could provide shelter, and habits of communication that could provide transmission media, for memes'.[11]

Though they are ideas it is important to note that memes must have vehicles—e.g., pictures, books, sayings—which 'carry' them. The disappearance of all physical embodiments amounts to the death of a meme. Hence, its fate 'is determined by whether copies and copies of copies of them persist and multiply, and this depends on the selective forces that act directly on the various physical vehicles that embody them'.[12] So, the persistence of a meme, which is an abstract entity, depends on the persistence of its vehicles, which are physical. But simple replication of a vehicle, which a high speed Xerox machine can do, is not enough: 'memes still depend indirectly on one or more of their vehicles' spending at least a brief, pupal

[10] Ibid.
[11] Op. cit., note 7, 345.
[12] Op. cit., note 7, 348. An interesting distinction that Dennett does not touch upon is between memes that copy themselves promiscuously but once only—they have many children, but no grandchildren—and memes which run through many generations. In an age of broadcasting by mass media, there are many examples of 'mule' memes to choose from.

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stage in a remarkable sort of meme nest: a human mind'.[13] Unfortunately, entry to the nest is not guaranteed since human minds have a limited capacity, with the result that memes have to compete for admission. This competition is the main selective force at work:

> Like a mindless virus a meme's prospects depend on its design—not its 'internal' design, whatever that might be—but the design it shows the world, its phenotype, the way it affects things in the environment. The things in its environment are minds and other memes.[14]

However, the lines separating the meme proper (an idea) from its vehicles on the one hand, and its phenotypic effects on the other, are not always clearly drawn. The success of a meme depends in some way on its phenotypic effects. These effects must, moreover, facilitate replication since Dennett argues that the differential fitness of memes is to be measured only by their success at replicating themselves. Thus, he says that what is tautological for his theory is that 'Meme *X* spread among the people because *X* is a good replicator'.[15] Moreover it would seem that good replicators replicate with some abandon: 'Memes now spread around the world at the speed of light, and replicate at rates that make even fruit flies and yeast cells look glacial in comparison. They leap promiscuously from vehicle to vehicle, and from medium to medium ...'[16]

The reference to 'internal design' above provokes the question: what stands to a particular meme as DNA does to a gene? Some have proposed that this is a complex brain structure, which is in effect the meme's genotype, whilst the vehicle is its phenotype.[17] However, this is a view that Dennett rejects. He argues that it would be a mistake to *identify* a meme with a specific brain structure, just as it would be a mistake to identify a gene with a stretch of DNA. However one could grant that in the latter case this is a mistake, and

[13] Op. cit., note 7, 349.
[14] Ibid.
[15] Op. cit., note 7, 364.
[16] Op. cit., note 7, 347.
[17] This position is taken by E. O. Wilson: 'The definition of meme I suggest is ... the one proposed by the theoretical biologist Charles J. Lumsden and myself in 1981, when we outlined the first full theory of gene-culture coevolution. We recommended that the unit of culture—now called meme—be the same as the node of semantic memory and its correlates in brain activity' (E. O. Wilson, *Consilience: The Unity Of Knowledge* (London: Little, Brown & Co., 1998), 149).

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still insist that a gene must have a substrate. Substrate-neutrality implies that genes might not have been embodied in DNA, but it doesn't imply that they don't need to have a substrate. The chemical properties of DNA, messenger RNA, etc., play a crucial, and far from self evident, part in the account of replication of genes in our world. If in some other world genes have a different substrate, one would still expect the account of replication to depend on physical properties of that substrate.

If, however, a complex brain process cannot be the substrate of a meme, as Dennett argues for the above and other reasons, then either a meme has no substrate, or it is in some way embodied in its vehicle. On the first view memes don't have a genotype (unless, for all that it is abstract, it is its own genotype), whilst on the second there is no interesting distinction to be drawn between a meme's genotype and its phenotype.[18] But though, at this point the analogy is less than four square, in other respects it seems to stand up well. According to the gene-centred interpretation of the evolution of organisms by natural selection there are only replicators (genes) and their hosts (organisms), and the competition for survival is between the former. Similarly, according to the meme-centred view of cultural evolution by natural selection there are only replicators (memes) and their hosts (minds), and the competition for survival is between the former.

Even so a question remains. Why, if memes have vehicles in the world beyond our minds, is it absolutely essential that they find a home, however briefly, in a human mind? Is this because it is in some way essential to their success as replicators? But if that were accepted, then the analogy with genes would be in danger of falling apart, since human minds would be something more than mere hosts to memes. On the other hand, if it is denied that they are anything more, so that minds are simply repositories or warehouses for memes, then it is hard to see what account can be given of replication. Since memes are abstract entities, they cannot intelligibly be held to succeed in replication entirely on their own; but no more can their vehicles replicate themselves, if they are such things as pictures, books and utterances. The difficulty there is in explaining why memes *must* inhabit minds, however briefly, is indicative of underlying tensions in Dennett's position, which we discuss in the next section.

Note also that though a meme must have a vehicle, 'meme' is nevertheless primarily a *semantic* classification, 'not a *syntactic* classifi-

[18] See J. Maynard Smith, *Did Darwin Get it Right? Essays on Games, Sex and Evolution* (Harmondsworth: Penguin, 1993).

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cation that might be directly observable in "brain language" or natural language'.[19] Presumably, it would be difficult to maintain that memes were substrate-neutral if they were encoded in 'brain language'. But surely, Dennett argues, they are not: for we would be flabbergasted if

> ... the brain-cell complex that stored the original meme for bifocals in Benjamin Franklin's brain was the same as, or very similar to, the brain-cell complex that is called upon today to store the meme for bifocals whenever any child in Asia, Africa, or Europe first learns about them by reading about them, seeing them on television, or noticing them on a parent's nose.[20]

Perhaps we would. But if the substrate differed in this kind of way, then a major contrast with genetics would emerge. There is just one genetic code, but instead of being able to speak of a single 'memetic code' we would have to accommodate many different memetic codes.

b. *Consciousness and its atoms*

According to Dawkins and Dennett, the primary application of the meme concept is to the development of human culture. However, Dennett also introduced memes into his discussion of human consciousness, and suggested that 'Human consciousness is *itself* a huge complex of memes (or more exactly meme-effects in brains)'.[21] Indeed, it seems at times as if Dennett himself wishes to treat all mental contents as 'memes', as when he speaks of the human brain being populated or invaded by memes, which (among other things) constitute personal identity. However, at other times he tells us that before a brain could accept a meme, it must already possess a natural language. To receive a language-borne meme, you must already have mastered a language, so that Dennett does not suggest that the language is itself a meme. Further, in his discussion of unit size, he assumes that there will be components below the critical length required to qualify as a meme.[22] So that although memes are 'the smallest elements that replicate themselves with reliability and fecundity', they are themselves composed of other elements (words, Lockean ideas, notes from the musical scale).

[19] Op. cit., note 7, 354
[20] Op. cit.. note 7, 353.
[21] D. C. Dennett, *Consciousness Explained* (Boston: Little, Brown, 1991), 210.
[22] Op. cit., note 7, 344.

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Thus even if meme-replication and selection instantiate the formula for an evolutionary process, memes are not primitive elements either in the conceptual order, or in the order of the humanly discriminable individuals from which memes may be built. Memetics is an atomistic programme in spirit, but its atomism does not go 'all the way down'. Meme-hood is rather an emergent character of sentences or texts, of discourses, of sequences of musical notes, of assemblages of garments, where memes emerge only at the point where the collection achieves fertility.

Note also that an insistence that the term 'meme' is to be applied only to the *smallest* elements that replicate themselves faithfully and reliably is at odds even with Dennett's own chosen examples. The *Odyssey*, the calculus, and chess are complex wholes with parts or sub-skills that can be learned and passed on, without learning the whole. Some memes are (surely) built from other memes. We can say this without scrutinizing the notion of 'smallest element' more closely, although we suspect it would not stand up to such scrutiny.

Finally, it is Dennett's own thought that a meme is an entity of the appropriate type (his example is of a musical phrase) that has reached a critical size (length) to qualify as a meme. It is equally clear that size alone does not ensure meme-hood, if we consider (without using meme-coloured spectacles) the class from which particular memes are drawn. Tunes provide one example: considered as sequences of musical notes, not all sequences are tunes, and not all those sequences that qualify as tunes manage to 'catch'. Another example is *jokes*. Candidate jokes are discourses or texts. Some such texts are intended to qualify as jokes, but most of those end up on the script-writers' floors and in their wastebins, and never make it to the starting line in the replication stakes. On Dennett's definition, then, the abandoned tunes and jokes are not memes, only their more successful stable-mates are.[23] The requirement of fertile and reliable reproduction cuts across our other classifications. Memes are not a 'natural kind' by any stretch of that flexible phrase.

So, we conclude that memes are asexual replicators which must have vehicles, but for which no useful distinction between genotype and phenotype can be drawn. They compete for the occupation of minds which, apart from being hosts to memes, bring nothing to the party. Their differential fitness is directly proportional to their success as replicators, and though from our point of view they have been around for a long time, in terms of (biological) evolutionary time the tokening of memes is a very recent phenomenon. Finally,

[23] A possible rejoinder to this criticism would be that the unsuccessful tunes and jokes are like lethal mutations. But this requires a robust theory of the meme-substrate, precisely what is lacking.

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'meme' is primarily a semantic, not a syntactic, category; but they are not semantic atoms, and no account is given of how they are constructed out of smaller elements, or of how they themselves cohere with other memes.

III. Underlying Tensions

A central plank of Dennett's argument is, as we saw, that the theory of evolution by natural selection is substrate-neutral and algorithmic. Hence it can apply in principle to a wide range of subject matters. At the same time, as we also saw, he defends a meme-centred view of cultural evolution which is structurally analogous to the gene-centred view of the evolution of organisms. But the second position is not obligatory given the first; if the substrate doesn't matter, then a wide range of options is in principle open to us. Provided the three conditions of variation, replication and differential fitness apply to a class of entities, then, according to Dennett, natural selection will take place. Even if this is so, it is hard to see *a priori* that the theory of those entities must be isomorphic in any other respect to Dawkins's gene-centred view.

Choosing the option that he has, Dennett is forced to look for analogies in rather implausible places. For instance, his choice of the meme as the unit of selection is, as we suggested, a fairly unpromising choice of something whose survival depends on its success as a replicator. Neither it nor its vehicle is self-replicating in the way in which genes embodied in DNA are. However, if we are to preserve the analogy, we must not introduce something else to explain how replication happens.[24] No doubt talk of memes leaping promiscuously from vehicle to vehicle is somewhat colourful. On the other hand, the introduction of a third party to give them a helping hand, however welcome, would give the show away. The selfish gene needs no such helping hand; nor should the selfish meme if the strict analogy is to be preserved.

The structural similarity between the gene-centred theory of the evolution of organisms and the meme-centred theory of cultural evolution should not be allowed to conceal just how different the two theories are. The second has a different ontology, and has to rely on different mechanisms to explain replication. As a consequence new accounts of variability, replication and fitness appropriate to the new domain are called for. These will be the subject of discussion in the next section. But we believe that more than that is needed.

[24] Unless, of course, we want to invoke properties of the substrate. But that option is not available to Dennett.

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It is surely reasonable to ask how, why and when memes acquired the vehicles needed to equip them for their specialized take-over business.

This might seem unfair. Modern genetics is an essential part of the modern synthesis of evolutionary theory. It tells us how genes replicate themselves, how they are inherited, the rate at which they mutate, etc. But though it is interesting to speculate about the origins of DNA and RNA, evolutionary or otherwise, no one supposes that an inability to answer such questions invalidates explanations of variations of phenotypical properties of members of a population in terms of variation in the genotype. Why then should memetics be called on to explain why and when memes acquired the vehicles essential to their success as replicators?

Part of the reason why this is required is because though memetics is structurally similar to the gene-centred interpretation of evolution by natural selection, its ontological commitments are completely different. Memes and their tokenings (and their phenotypical expressions) play no part in the gene-centred interpretation of natural evolution. So can we be sure that the new entities introduced by this ontology can play the causal roles required? Moreover, can we be sure that the appeal to them is genuinely explanatory of the development of cultural phenomena?

In the case of genetics there is a clear distinction between genotype and phenotype, so that the fact that variations in the former can be statistically correlated with ones in the latter is both surprising and explanatory. But to the extent that it is doubtful whether any clear distinction between genotype and phenotype can be drawn in the case of memes, it is doubtful whether this kind of Mendelian explanation is available to memetics. Further, if we distinguish what is to be explained and what is invoked to explain it, there is indeed a striking difference between (for example) the distribution of the properties of being wrinkled and being smooth-skinned in peas, and the patterns of inheritance of Mendelian genes. In the case of memes, there seems to be a danger of collapse so that all the theory manages to `explain' is that memes reproduce themselves. We return below to a broader question about the explanatory force of the appeal to memes.

In this context the following is interesting:

> One fine day, another invasion began, in a single species of multicellular organism, a sort of primate, which had developed a variety of structures and capacities ... that just happened to be particularly well suited for these invaders [memes]. It is not surprising that the invaders were well adapted for finding homes in

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> their hosts, since they themselves were created by their hosts, in much the way spiders create webs and birds create nests.[25]

The first thought, that memes are take-over artists which invade the right kind of niche, invites the question what features that niche must have for memes to acquire their typical phenotypical expression at that time. However, the second thought suggests that the host played at least some part in their creation, and this is why the niche was appropriate. But the qualification in the second thought steps back from the implications of the first, and is a good illustration of the tension that exists in Dennett's position.[26] Nevertheless, if Dennett wishes to maintain that 'The "independent mind" struggling to protect itself from alien and dangerous memes is a myth'[27], then the implied qualification in the second thought is a slip—for all that it may be a revealing one. His position is that minds are nothing over and above the memes they contain (or rather, are composed of).

Thus the key questions are: can memes and their tokenings play the causal roles they need to play if memetics obeys the laws of 'natural selection exactly'? Second, how and why did memes acquire the vehicles they needed to colonise the brains of a hominoid? Finally, is an appeal to them qua semantic entities genuinely explanatory of the development of human culture?

IV. Memes, Culture and Natural Selection

We saw that Dennett claims that the theory of natural selection applies not merely metaphorically, but quite literally, to the evolution of culture. In that case the evolution of cultural phenomena should have a tree like structure, which is the outcome of descent by modification from a common ancestor. Dennett ought to accept this, for he argues that:

[25] Op. cit., note 7, 341.

[26] This tension is also evident in the following passage: 'The haven all memes depend on reaching is the human mind, but a human mind is itself an artefact created when memes restructure a human brain in order to make it a better habitat for memes' (op. cit., note 7, 365). This suggests that a human mind is nothing more than the memes it contains. But a little later this suggestion is qualified: 'But if it is true that human minds are themselves to a very great degree the creation of memes, we cannot sustain the polarity of vision which we considered earlier.' But then if it is only to a great degree that they are the creation of memes, what else is involved in the creation?

[27] Op. cit., note 7, 365.

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> there is a single Tree of Life, all the limbs, branches and twigs united by descent with modification. The fact that it has the branching organization of a tree is crucial to the sort of explanation of the process involved, for such a tree *could* be created by an automatic, recursive process: first build an *x*, then modify *x's* descendents, then modify these modifications, then modify the modification of the modifications ... [28]

But though cultural phenomena change over time, it is far from plausible to suppose that the result has a structure of this kind. Cultural traditions can diverge, and then borrow from each other, like a cuisine which is neither French, Chinese or Thai, but is influenced by all of them. As Gould has argued:

> A lineage, after branching off from ancestors as a new species, attains an entirely independent fate. Nature cannot make a new mammalian species by mixing 20 per cent dugong with 30 per cent rat and 50 per cent aardvark. But cultural change works largely by an opposite process of joining, or interconnection of lineages. Marco Polo visits China and returns with many of the customs and skills that later distinguish Italian culture.[29]

So do memes, the units of cultural selection, behave in a way that permits the principles of natural selection by adaptation to apply to them strictly? Do they mutate? Are they inheritable? And how is fitness to be measured?

Before trying to answer these questions, we want to point out that it is hard to see how Dennett can give a single and general answer to them, since memes are of very diverse kinds—as we pointed out above, they form anything but a 'natural kind'. A broad distinction can be made between those that are truth bearers, or constituted by truth bearers, and those that are not. To the former category belong ideas, the theory of evolution and calculus, whilst tunes, wearing clothes and building arches belong to the latter. This is, of course, not an exhaustive classification, since within the second category, for instance, one might want to make a distinction between practices (e.g., wearing clothes) and abstract systems whose existence is a necessary condition of a practice (e.g., the alphabet and writing). Moreover, some memes perhaps contain elements which belong to both of these categories: for whilst impressionism is primarily a painterly technique, it was also an artistic movement which issued

[28] Op. cit., note 7, 61.

[29] S. J. Gould, 'Evolution: The Perils of Pluralism', *The New York Review of Books* (June 26, 1997), 52.

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manifestos. But the main point is that it is unlikely that generalizations about members of one of these categories will apply to members of the other. Indeed, it is not that clear that some members of the second category even have some of the defining features of memes, in that it is hard to see how to make a distinction between a content and a vehicle (e.g., a jingle), or that a mind could be a host to it (e.g., wearing clothes).

(a) *Mutation*

It is a key feature of the theory of natural selection that most mutations are non-adaptive. It seems to be agreed that this is *not* true of changes in memes. We often introduce such changes because of their perceived utility (theoretical and otherwise), and these are then fixed in our culture by such processes as argument and empirical testing. But does it matter? Mayr has argued that it does not:

> The variation, for instance, among the various theories is not caused by chance, as is genetic variation, but by the reasoning of the promoter of these theories. While true this is not a weighty argument because the source of variation is of little consequence for the Darwinian process.[30]

Mayr's interest here is primarily with the evolution of scientific theories, not with that of memes in general. But even if what he says about theories is correct, the response is clearly not helpful from Dennett's point of view. If we are nothing over and above our memes—if the 'we' that transcends its memes is a myth—then 'our' role in their creation has to be minimal. That Dennett does indeed believe that it is minimal seems to be the point of the following:

> The other day I was embarrassed—dismayed—to catch myself walking along humming a melody to myself. It was not a theme of Haydn or Brahms or Charlie Parker or even Bob Dylan: I was energetically humming: 'It Takes Two to Tango,'—a perfectly dismal and entirely unredeemed bit of chewing gum for the ears that was unaccountably popular in the 1950s. I am sure that I have never in my life chosen to listen to this melody, esteemed this melody, or in any way judged it to be better than silence, but there it was, a horrible musical virus, at least as robust in my

[30] E. Mayr, *This is Biology: The Science of the Living World* (Cambridge, Mass.: Belknap Press), 100.

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> meme pool as any melody I actually esteem. And now to make matters worse I have resurrected the virus in many of you...[31]

In so far as what is at stake is the repetition of a boring tune, this meme is, of course, only an example of the second category distinguished above and, as such, is irrelevant to a consideration of truth bearers. However, the melody is accompanied by words,[32] and it could be that the somewhat trite thought embodied may have had something to do with Dennett's humming the tune—perhaps he had just made a placatory offer which someone had unreasonably refused.

To strengthen his argument Dennett goes on to add that whilst some memes are 'good from our perspective' others—anti-semitism, hijacking airliners, spray-can graffiti and computer viruses—are 'pernicious, but extremely hard to eradicate'.[33] The implication is presumably that 'we' would not deliberately propagate the latter, and that a meme's truth or beauty is not the reason why it spreads. It spreads simply because it has properties which make it a good replicator. But whilst we (the authors) agree that these memes are indeed pernicious, the examples don't themselves make Dennett's point. Though the interests of all of us are not served by the propagation of them, those of some of us surely are. What is to your advantage, may not be to mine. The propagation of an 'immoral' meme that serves a minority vested interest can be explained without the need to appeal to the meme's autonomous replicative capacity.

There are memes that are not (by any account) immoral that none the less serve a function provided only that they populate only a minority of the available minds. And that they serve this function may provide explanation enough for their retention and (limited) propagation. An example is any belief or practice that helps to mark out a group by distinguishing members from non-members. O'Hear's point is well taken:

> If a society is partially defined through a system of commonly held beliefs, there is obviously an advantage in having a set of peculiar and idiosyncratic beliefs; up to a point the more peculiar and idiosyncratic, the greater the bonding power, social bonding being highly adaptive for a society in terms of the resulting co-

[31] Op. cit., note 7, 347.

[32] Without identity conditions for memes it is difficult to know how many to count in this case. Presumably, however, there are at least two: the melody and the words.

[33] Op. cit., note 7, 363.

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> operation between members... In the evolution of a society, a false set of community-wide beliefs can be a positive evolutionary advantage.[34]

So we conclude that thus far it is just not clear that Dennett can give an account of meme mutation that denies their human hosts a major role. This is an issue that we will pursue further in the next section.

Three other points are worth noting. As long as we have no clear identity conditions for memes, it is not clear what counts literally as a mutation, and what is just a different and unrelated meme. It will not do simply to say 'Though we can't be sure which it is, either the putative copy has the same content, or it is a mutation'. We must have a firm grasp of *faithful* replication to have one of what counts as a mutation. So perhaps all that we are entitled to claim is that there is variety, not variation, and strictly speaking there is *nothing* analogous to mutation in the case of memes.[35]

Second, if memes do mutate they do so with extraordinary rapidity, making it difficult to see how, if at all, their survival or extinction can depend on selective pressures. Sperber recalls an observation by G. C. Williams on the conditions for natural selection: roughly, that replication must be faithful enough to ensure that traits that survive weeding by selective pressures are preserved, and mutation levels must not threaten faithfulness of replication to the point where adaptive traits are lost more often in offspring of adapted individuals than less adapted individuals are picked off (by selective pressures in the environment). Sperber goes on to make a powerful point:

> In the case of genetics, a typical rate of mutation might be one mutation per million replications. With such low rates of mutation, even a very small selection bias is enough to have, with time, major cumulative effects. If, on the other hand, in the case of culture there may be, as Dawkins acknowledges, 'a certain "mutational" effect in every copying event', then the very possibility of cumulative effects of selection is open to question.[36]

[34] A. O'Hear, *Beyond Evolution* (Oxford: Clarendon Press, 1997), 65. O'Hear goes on to say that 'as writers from Plato to Hayek and Roger Scruton have pointed out, there can be great advantages to societies in having mutually advantageous moral practices upheld by myths or noble lies.'

[35] In the case of genes a mutation is a change in the substrate, e.g., the loss or insertion of a base pair; but there can be nothing analogous for Dennett in the case of memes.

[36] D. Sperber, *Explaining Culture: A Naturalistic Approach* (Oxford: Blackwell, 1996), 103. See also op. cit., note 18, 184.

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Finally, since memes are semantic, there are kinds of dependence between them that lack genetic analogues. For instance, French cuisine could not have antedated cooking, cooking could not have antedated lighting a fire, etc. The meme for impressionism incorporates the meme for perspectival drawing.[37] Mutation, or variation, could not, therefore, have been completely random. But whatever constraints on the possible historical order of development of memes follows from this, it is hard to see anything analogous in the case of genetics.

(b) *Replication and inheritance*

We have already made the main point we want to make about replication, arguing that accounting for it is the source of an underlying tension in Dennett's argument. This is that since neither memes nor their vehicles are capable of being active as such,[38] it is difficult to see how Dennett can maintain, as he does, that human meme-hosts have no active part to play in their retention or replication. We do not wish, of course, to deny that memes might have properties that make them more or less memorable. But surely such properties are relational ones. So whilst feature *F* of *x* may make it memorable to *S*, it may well not do so to *S*1, because the former has interpretive skills that he/she employs but which the latter lacks.

This is connected with the further point that whilst one acquires one's genes by inheritance from one's parents, the sources of one's memes are very various. Doubtless many are acquired at one's mother's knee, but many arise from contacts with others. Moreover, in each case, the ways in which they can be acquired are very diverse, involving imitation, learning, teaching, conjecture, reflection, etc. To deny this, and to argue that only one of these modes is involved, is deeply implausible. Blackmore, for instance, gives pride of place to imitation.[39] But apart from the fact that it is far from clear that it is something we can do and other creatures cannot, one

[37] Logical presupposition is only one aspect of contentful relations between memes. Memes typically stand in internal relations to others, and those relations constitute them the memes they are (help to determine their content). But memes so related cannot properly be regarded as independent 'elements', or as 'atoms' of culture, at all.

[38] Dennett makes much of the fact that there has been an explosive proliferation of memes thanks to print, radio and television, fax, xerox, etc., (op. cit., note 7, 347). This is undeniable; but the existence of new technologies for proliferating them doesn't make them active.

[39] Op. cit., note 5, 3.

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surely does not want to deny that someone has a given meme because it has not been acquired in a canonical way.[40]

This point is connected with yet another. Often the criteria of success for a task involving memes do not require one to copy an existing item or exemplar. Told to get dressed, or to play, the child does not have to imitate or copy what he or she, or anyone else for that matter, did on a previous occasion. Indeed, there are many occasions in which the criteria of success require one not to copy, but to put things one's own way. If the teacher tells one to explain something in one's own words, then to copy an existing account misses the point completely. And though rote learning—replication conforming to some conventional standard—is an important part of learning, it is not even obvious that it is the largest part.[41]

The fact that many memes are acquired at one's mother's knee does not mean, of course, that they are inherited in the way in which genetically determined features of the phenotype are—inheritance in this context means only 'passed on by'. But what cognitive relation must my daughter stand in to a meme for it to be true that she has inherited it? Is it enough that she can entertain it and employ it in the construction of thoughts or theories, or must she in some sense endorse any propositional content involved? Which of these alternatives is adopted makes an important difference. If all that is required is understanding and entertainment, then the meme *communism* is still pretty successful in our society; but if endorsement too is required, this meme's success now is very modest. There is a lesson here too for the search for a 'scarce resource' for memes to struggle for. We can entertain vastly more propositions than we assent to. Furthermore, our minds can entertain vastly more propositions than are currently the focus of active attention, and can consider vastly more possible courses of action than we can carry out in practice even in the full course of our lives. The point has an important bearing on the way in which we are to understand differential fitness, a question to which we now turn.

(c) *Fitness*

As we saw above, Dennett is keen to deny that the spread of memes can be accounted for in terms of their perceived or actual utility to

[40] L. Gabora, Review of Blackmore op. cit., note 5, Journal of Consciousness Studies, (6, No. 5, 1999), 78.

[41] The fact that the criteria for success when copying can be conventional is (we suspect) a complication for any theory which tries to give pride of place to imitation when explaining the spread of memes, since it is not easy to see how the source of those criteria themselves can be imitation.

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us. He says that what is tautological is that 'Meme *X* spread among the people because *X* is a good replicator'.[42] At the same time, he tries to disarm the possibility that we might be overwhelmed with pernicious memes, which are successful simply because they are good replicators, by claiming that our survival depends on there being a better than chance possibility of our acquiring beneficial memes. Presumably the thought is that if this were not so the pernicious memes would have taken over and destroyed their hosts which would not have been in the interests of the memes themselves. But if, as we have argued, 'pernicious' memes are not necessarily destructive of their hosts, though their adoption by some may well be at the expense of others (slavery provides an example), the argument ceases to be cogent. So what external constraints does Dennett's theory place on the spread of memes? Is there nothing more to be said than that some are more successful at replicating themselves than others? If not, what is the selective process which weeds some of them out?

Because minds are in short supply and have a limited capacity, Dennett argues that there is competition between memes for admission to them, which is the main selective force at work. Moreover, memes show great ingenuity in ensuring that they will succeed in this competition. Some of them, for instance, have phenotypic expressions that tend to disable the forces that might reject them. For instance,

> the meme for *faith*, which discourages the exercise of the sort of critical judgment that might decide that the idea of faith was all things considered a dangerous idea: the memes for *tolerance* or *free speech*: the meme for including *a warning in a chain letter* about the terrible fates of those who have broken the chain in the past; the *conspiracy theory* meme, which has a built in response to the objection that there is no good evidence of the conspiracy.[43]

But apart from the fact that the mechanism has not always worked well—after all, faith has been on the decline for many years in Great Britain—what precisely is the phenotypic expression of the meme *faith*? It presumably is not simply a demonstrated ability to use the word 'faith'. For though that is indeed widespread, one might demonstrate that understanding by producing such utterances as 'Faith is indeed a dangerous idea'. But if, on the other hand, it has to involve the endorsement of a specific tenet of a faith, e.g., 'What our faith demands above all is commitment and obedience', that is

[42] Op. cit., note 7, 364.
[43] Op. cit., note 7, 349.

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unlikely to be widespread. On the face of it, the phenotypic expression of such a meme isn't something that it does, but something that *people* do when they assert, affirm, insist, etc, that something is so; so that it is hardly surprising that the endorsement of a specific tenet may be far from widespread.

Describing memes as 'viruses of the mind' does indeed suggest that they can spread like wildfire. But that would seem to be by no means normal, and anyway a very poor indicator of their effects on people's beliefs and attitudes. As Sperber says,

> the number of artefactual replicas of a would-be cultural item is only a poor, indirect indicator of its genuine cultural success. Waste-paper baskets and their electronic counterparts are filled with massively replicated but unread junk, whilst some scientific articles read by only a few specialists have changed our cultural world. The cultural importance of a public production is to be measured not by the number of copies in the environment but by their impact on people's minds.[44]

Sperber's observation about cultural importance points to a puzzling feature of memetics as presented by Dennett (and by Dawkins). Memes are gene-analogues, where genes are taken as the replicators of choice in the framework of a Darwinian account of biological phenomena. What Darwinism does—by common consent of all who accept a broadly Darwinian view—is to explain what appears to us as *design* in nature. The beauty of the peacock's tail, the speed of the cheetah, the silent flight of the barn owl ... all these wondrous adaptations are revealed as traits that have been preserved and handed down from generation to generation just because they conveyed a selective advantage. Both our human aesthetic appreciation and our admiration of aptness-for-purpose miss the true causal explanation of such phenomena. Darwinism provides that explanation, and manages incidentally to encompass many other adaptations that appeal far less to human tastes. The role that genes play in this story, at least for those who agree with Dawkins in treating genes as the primary replicators, is to provide components in a mechanism of reproduction that preserves, down the generations of individual phenotypes, those traits that have proved adaptive, and at the same time to provide a locus of mutation that very occasionally produces a new trait.

Two final points: Memes, we are told, can play a role in accounts of the preservation, development, and diversity of human culture,

[44] Op. cit., note 36, 103.

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similar to that of genes in biological evolution. However, insofar as memes are already cultural objects, we cannot appeal to them to explain the emergence of culture itself, any more than we can appeal to genes to explain the emergence of life itself. Memetics does not explain the emergence of the very first memes. Second, genes group themselves into genotypes, genotypes help to shape phenotypes whose 'design' we can then observe and wonder at. So what, in the case of memes, corresponds to 'design': what are we wondering at but for the wrong reasons, or misunderstanding in teleological or anthropomorphic terms when a meme-based reductionism can reveal their true causes? We are offered no answer to this question—except perhaps that it cannot be asked because no phenotypes have yet emerged.[45]

Selfish gene theory is a clever answer to a familiar question. Memetics is a clever answer too—or would be if it were true—but just what was the question?

V. Hitting the Target

The analogies that Dennett is able to adduce between meme mutation, replication, and fitness on the one hand, and gene mutation, replication and fitness on the other hand, are tenuous. So quite apart from the fact that memetics imports a novel ontology, it is difficult to see how the laws of evolution by natural selection could apply to memes strictly and not metaphorically, as Dennett claims they do. However, it may be that our arguments have missed their target; for the somewhat surprising thing is that Dennett himself accepts many of them, yet evidently does not believe that they undermine his position.

For instance, in the course of discussing the question whether memetics could be a science, Dennett concedes that meme replication is frequently inexact, so that memes have a high 'mutation' rate: Isn't one of the hallmarks of cultural evolution and transmission the extraordinarily high rate of mutation and recombination? We *seldom* pass on a meme unaltered, it seems, unless, we are particularly literal-minded rote learners.[46] Moreover, he agrees with Pinker that much meme-mutation is *directed* (intentional), and with Gould that

> The basic topologies of biological and cultural change are completely different. Biological evolution is a system of constant divergence without subsequent joining of branches. Lineages,

[45] Dawkins writes of the meme as 'drifting clumsily about in its primeval soup', like a primitive unicellular organism (op. cit., note 1, 206).

[46] Op. cit., note 7, 355.

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> once distinct, are separate for ever. In human history, transmission across lineages is, perhaps, the major source of cultural change.[47]

Does it follow then that there cannot be a science of memetics? Dennett argues that we should be wary of confusing a metaphysical point with an epistemological one: 'if species weren't rather static, we couldn't *find out* and organize the facts needed to do certain kinds of science; that wouldn't show, however, that the phenomena were not governed by natural selection'.[48] So the most we are entitled to conclude from the rapidity of mutation, the muddled lines of descent, etc. is that 'even if memes *do* originate by a process of "descent with modification", our chance of cranking out a science that charts that descent are slim'.[49]

Moreover, we should, Dennett argues, take comfort from the possibility of adopting an *intentional stance*. Doing this involves the attribution of intentionality to others to make sense of their behaviour and to predict it, in circumstances in which the underlying physical and neuro-physiological complexity is so great that we have no chance of understanding it and predicting it at that level. If then, we adopt an intentional stance in the case of memes, we may hope to discern patterns and to make predictions, which would otherwise elude us.

However, this response is puzzling. Dennett's rejection, or at the very least his deep suspicion, of the existence of a substrate for memes means that memetics is not presented as a physically based theory. So what illusion are its adherents freed from by adopting an intentional stance? Further, even if we do wholeheartedly embrace the intentional stance, it is not clear that we have an answer to the point that a frequent and high mutation rate precludes any one mutation conferring a selective advantage through the mechanism of natural selection. Nor does it seem likely that we will discover after all that mutations are not directed, or how to pull apart convergent lines of descent. Indeed, Dennett concedes as much:

> To the extent that we have to go to quite abstract functional (or semantic) levels to find our common features, we lose the capacity to tell homology from analogy, descent from convergent evolution. Students of culture have always tacitly appreciated this, of course, quite independently of Darwinian thinking.[50]

[47] Ibid.

[48] Op. cit., note 7, 356.

[49] Ibid. This seems not to take Sperber's point about the mutation rate; that it must not be too rapid is a condition of natural selection operating, not just of our knowing about it.

[50] Op. cit., note 7, 357.

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So it is just not clear how adopting the intentional stance helps. It would do so only if it became clear that the original prima facie objections are met. But it has not.

One final point. The claims about memes are meant (at least by Dennett) to be taken realistically. Memes that are truth bearers have contents that need to be construed Platonistically, or as Fregean senses. At some time, so the story goes, in a somewhat mysterious way, they acquired vehicles, occupied brains, and created human minds. But if all that is available to us is an intentional stance, then this is a myth, albeit a noble one; for there is nothing to content over and above the attributions made by our theory of interpretation. This indeed seems to be Dennett's own view: 'There are no real, natural, universal units of ... semantic information'.[51] Thus, there is a serious question whether there is available to Dennett a theory of meaning that would afford to memes the kind of robust status that memetics demands of them.

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[51] D. C. Dennett, 'About Aboutness', *The Intentional Stance* (Cambridge, Mass.: MIT Press, 1987), 208.

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