The Trouble with Memetics

A meme, according to the by-now-standard dictionary definition, is “an element of a culture or system of behavior that may be considered to be passed from one individual to another by nongenetic means, especially imitation.” The idea (a meme itself?) was first introduced by Richard Dawkins in his 1976 book, The Selfish Gene. Dawkins’s intention was to make the point that evolution by natural selection is not limited to genes and that it isn’t an accident of life on Earth. Rather, Darwinian principles are universal, and they apply to whatever other system features the basic characteristics of heritable variation in attributes affecting fitness.

But we only know of one such system, life on Earth, and that system is inextricably dependent on genes. Moreover, life on our planet probably evolved only once, and it isn’t all clear that such evolution was inevitable or even highly probable. So how could Dawkins make the argument that Darwinian principles are universal (without waiting for the discovery of life on Mars)? Enter memetics. The basic concept is that there is, in fact, at least one other class of “replicators” subjected to natural selection: memes. Derived from direct analogy with genes (and with a nice Greek root in the word mimema, which means “that which is imitated”), they indicate that ideas, or mental constructs, can be thought of as replicators competing for space inside human minds.

Memes have caught on in a limited way. The new term has made it into dictionaries, and a small number of books and even a dedicated technical journal have discussed all things memetic. And yet there is quite a bit that is rather unconvincing about the whole idea. To begin with, unlike the case of genes, there doesn’t seem to be any distinction between memes themselves and the phenotypes they produce. Genes in some sense “encode” proteins, and proteins have a variety of effects that indirectly contribute to the fitness of the organism carrying those genes. In Dawkins’s own terms, there is a distinction between “replicators” (the genes) and “interactors” (the organisms themselves).

But, in the case of memes, the replicating “unit,” for example, an annoying tune that gets into your head, forcing you to whistle it, and thereby gets stuck into somebody else’s head, is both replicator and interactor. This isn’t necessarily a fatal problem, but it begins to point toward a disanalogy between genes and memes. And it gets worse.

The second problem with memes is that nobody seems to know what their physical basis is. Genes are—roughly speaking—pieces of nucleic acids (DNA or RNA), with known physical-chemical characteristics. But memes can be instantiated equally well inside someone’s mind (where presumably they correspond to specific patterns of neuronal firings), on a computer’s hard drive, in a book, or on an iPod. While it is true that, for decades after Gregor Mendel proposed the idea of genes, biologists didn’t know what they were made of, the likelihood of pinpointing a physical makeup for memes is less likely because they seem to be a sort of “diffuse” entity that can have many physical incarnations. Again, this is disanalogous with genes.

As a result of this ambiguity, it is pretty much impossible to tell what constitutes a meme. The typical examples in literature vary from the above-mentioned annoying tune to religion. The latter kind of meme is often referred to as a “meme complex,” or “memeplex.” This is again supposed to be analogous to the fact that sometimes groups of genes with a common evolutionary history are found physically linked on a chromosome to form gene complexes, with the complex (rather than individual) genes being the target of natural selection. But the idea works for genes because of their identifiable and stable physical nature. In the case of memes, there is no way to tell what constitutes a memeplex, other than the arbitrary interest of the researcher.

As if all of the above were not cause for a pause, there is a further, more crucial problem with the idea of memes: it is not predictive. Philosopher Karl Popper once said that evolutionary theory is not a scientific theory but rather a “metaphysical research program” (see “Thinking about Science,” September/October 2004). What he meant was that it is not possible to...

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falsify or test the theory because it is based on a circular definition: it says that natural selection favors the survival (and reproduction) of the fittest, but it then turns around and defines the fittest as those who survive (and reproduce). Creationists are fond of this statement by Popper, without realizing that the philosopher himself eventually admitted that he was wrong. Popper had misunderstood the nature of evolutionary theory, not having realized that there are independent ways of making predictions about the fitness of organisms (based on our understanding of the functional ecology of their characteristics). This breaks the circle and makes evolutionary theory a standard scientific theory.

But Popper’s objection remains valid for memetics: the only way to tell which memes are going to be successful, which tunes are going to stick in your mind, or which religions are going to become popular is by waiting and seeing what happens. That is, memeticists completely lack a functional ecological theory of memes. Without it, the whole enterprise is scientifically empty.

Indeed, memetics—at least for now—doesn’t seem to add anything to the standard view of gene-culture co-evolution that was developed well before Dawkins put down his ideas in The Selfish Gene. Ideas clearly do evolve, and there is in fact a somewhat undeniable analogy between memes and the evolution of genes. But we don’t need to push that analogy too far, and we certainly don’t need a whole new vocabulary to make sense of it.

Finally, despite the questionability of memetics, Dawkins’s claim about universal Darwinism is probably correct, and we do have a nonbiological example to study at our leisure: computer scientists have discovered the idea of “genetic” algorithms, i.e., computer programs that can literally evolve by mutation and selection, perfectly mimicking the biological process. Indeed, researchers in this field have independently rediscovered many of the laws and generalizations that population geneticists have produced ever since the beginning of modern genetics at the dawn of the twentieth century.

Darwinism, therefore, does seem to be a universal property of certain kinds of systems. Memes, on the other hand, have a long way to go before becoming a sufficiently fecund concept for scientists to work with.

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