THE FORM OF MEMES

Twelve Remarks on Memetics

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1. Let us assume that there exist such entities as memes. This notion (the meme) has been imagined in order to account for a range of cultural phenomena which do not seem to be explainable otherwise (e.g., arbitrary cultural changes, differential spreading of innovations, occasional extinctions of social practices, successful emergence of new patterns of behavior which may or may not be adaptive, etc.). The fact that the dynamic of these phenomena appears to be analogous to the evolution and extinction of biological species has led to conceiving them in the genetic mode and to hypothesize that they are governed by the Darwinian laws of evolution, i.e., memes replicate with variations which may or may not be selected by their environment.

2. This view on cultural evolution assumes that memetic entities are not a part of the human (or more generally primate) genetic endowment but must be construed as belonging to another order, or, through a metaphoric simplification, as another species, but a species that needs the resources of a complex brain to replicate and prosper among large populations of brains. The best model that biology offers to account for this kind of reproductive behavior is the one provided by parasites, that is, life forms which need one or more hosts of different species to complete their life cycles and successfully reproduce. The theme of "memes as parasites" has created the powerful image of human populations variously "infected" by alien ideas, habits, and norms that become entrenched in the brains of their hosts without any other concern than their own survival and reproduction (hence the pervasive notion of "selfish meme"). It is worth noting however that the abundant literature that was spawned by this vision of the hypothetical meme has relied more on the model of parasitoids than parasites proper with consequences that will be outlined below.

3. While the image is poetically powerful and, in all appearance, dramatically fits some non-functional (ill-adaptive) aspects of cultural life, the hypothesis still lacks basic elements for being taken seriously by the disciplines most obviously concerned such as the neurosciences, information theory, and sociology. The memetic hypothesis is indeed formulated as a loose analogy with genetics. It is not expressed in the formal language of the empirical sciences, and even its more precise formulations are unfalsifiable. It can however be considered as a heuristic notion that should be trimmed of the most spectacular images it has attracted (e.g., the brain as a "nest of memes" that take over the body and mind of their victim, the uncontrollable viruses that infect whole populations which become obsessed with spreading these viruses at the expense of their own offspring). Then, it can be examined on its own merit, and, perhaps, it could be given a form amenable to empirical investigation.

4. The first step in this direction is to determine, at least tentatively, the ontology of memes, and to specify their form. Such a fundamental question is generally glossed over in the memetic literature, and authors tend to rely on metaphoric expressions. The

analogical reasoning that has constrained so far such attempts has led to fuzzy notions. These ambiguities permeate the current discourse of memetics. Among the most blatant ones is the implicit representation of memes as nano-organisms that jump from brain to brain through the ill-defined notions of communication and imitation, and clone themselves exponentially among populations. Another confusion results from the genetics metaphor which is transposed to memetics as if it were unproblematic. The literature is cluttered with seemingly compelling examples of memes (songs, beliefs, gestures, etc.) without specifying if these instances should be considered as the equivalent of genotypes or phenotypes, and by skipping the developmental processes that remains a controversial issue in evolutionary biology. Analogical reasoning may be a heuristic resource of the human cognitive competency but one that leads more often than not to erroneous, sometimes fatal beliefs. Scientific inquiry has consistently strived to steer away from the fallacies of analogies.

5. If memes are more than a delusion (a literary image that expresses human anxiety and alienation), they must have a form. However, such a form must be biologically relevant and not a purely mathematical concept. A form can be conceived and represented as a pattern or by the algorithm that generates this pattern. Furthermore, a form that is biologically relevant is relative to an organism that perceives it. Such a form can be realized only at the interface between environmental information and a perceiving brain which is constrained by its long evolutionary history. However, it should be kept in mind that biologically relevant forms can be outside the scope of perceptual awareness. Memetic literature usually treats the brain as a neutral milieu that provides free resources to memes eager to replicate with various degrees of success. But it would seem that a meme must be as much a creation of the brain as it is a creation of exogenic information. Some memes can also theoretically be conceived as endogenic to the brain. But if memes are the Trojan horses that memetics suggests, the question to be asked is: how can biologically maladaptive algorithms be admitted by a brain as if they were biologically relevant? It is not necessary to imagine memes as smart deceivers simply because brains have evolved an adaptive strategy that consists of taking perceptive shortcuts to reach fast decisions, an advantage that carries also a cost: the risk of making errors through reaching decisions based on incomplete information, thus providing a window of opportunity for some algorithms to leak in, and, possibly, to set in and exploit local neurological resources.

6. Memetics assumes that memes replicate and evolve. This suggests that memes have a certain degree of autonomy, an inherent mechanism that allows them to replicate (with occasional variations) through self-cloning once they are set in a brain. How this is done is, of course, never specified in the literature. We are again confronted with the nano-organism representation of the meme. As long as this hypothesis has not been demonstrated to be correct, for instance by visualizing through a powerful microscope the morphology and physiology of such nano-organisms, it is reasonable to identify alternatives in order to account for the replication of memes. More probably, memes cannot replicate by themselves but trick the hosting brain into replicating them. Naturally, the use of “tricking” does not imply that memes have deviant intentions, but instead evokes a process of the kind that allowed their algorithms to get access to the brain in the first place. If this were demonstrated to be the case, the whole problem of the form of

memes would have to be reassessed in light of what is known about mimicry, one of the most pervasive evolutionary strategies that does not involve intentionality.

7. The complexity and shortcomings of the brain itself are not sufficiently taken into consideration when it is presented in the current literature as an "affordance" that memes exploit. The brain has evolved hard-wired cognitive competencies and behaviors which can be primed by limited information. While it can be safely considered that such evolved behaviors were selected because they were adaptive in the environments in which they evolve, most carry a cost in the form of risks of errors due to the necessity of reacting quickly to situations and events. Priming can be triggered by incomplete or misleading information, and the resulting cognition and behaviors can be ill-adaptive. In fact, all adaptations can be so only within certain limits. On its own, it seems that the human brain can generate a host of ill-adaptive behaviors through illusory perception or addiction for instance without it being necessary to assign responsibility for this to "alien" agents such as memes. On the other hand, exogenic and endogenic parasitic algorithms can indeed opportunistically exploit the chinks in the evolved armor, so to speak. It is therefore important, when describing assumed memetic behaviors to use Occam's razor, and to make sure that there are not other, less problematic explanations for such behaviors.

8. Finally, memetics should pay closer attention to the neurochemistry of learning and memory. It is well known that in altricial species, whose young are born immature and depend for their survival on what they learn from their caretakers from the start of their life, there are periods of time when brain states are particularly receptive to learn, that is, memorize behaviors and beliefs. There may be also, outside of these windows of opportunities, neuro-chemical brain states that make possible changes in the cognitive and behavioral set which was stabilized at the end of the learning phase. It is possible that such neuro-chemical brain states determine whether new information is neutralized or upsets the cognitive landscape. Susceptibility to exogenic memes would then result from the weakening of "cognitive immunology" so to speak. The pathology of memory could provide relevant insights into such processes. In theory, any change in cognition and behavior assigned to the hypothetical intrusion of a meme can be broken down into functional "parts", each of which is already well studied in the cognitive neurosciences, such as the conditions under which short term memories are transformed into long term memories.

9. The notion of meme all too often lumps together components of cognition and behavior that are parts of the genetic endowment of humans (a dimension that has been explored by evolutionary psychology) and components that may indeed be of a parasitic nature. But in most cases which have been heralded by memetics, memes obviously piggyback, so to speak, on evolved competencies, let them be cognitive (e.g., beliefs) or behavioral (e.g., gestures). It would seem that memes are in the details, but details that can make a substantial difference. A telling example is what evolutionary psychologists called the "theory of mind", that is, a capacity which humans have evolved to form representations of others' intentions and feelings, and which is considered to be the basis for empathy and altruism, as well as interactive strategies that predict others' behavior. It is undoubtedly a highly adaptive feature in as much as it sustains social life through manipulation, cooperation, and mutual understanding. But it can overreach its adaptive quality by extending beyond conspecifics, and even applying to dynamic inanimate

objects in the environment such as trees, volcanoes, stars and planets. Reading intentions in the movements of these objects, and trying to manipulate them open the way to highly maladaptive behaviors, for instance by squandering precious resources in sacrifices. Memes can fester in the flaws of adaptations such as theory of mind or analogical reasoning.

10. A most promising field of inquiry for memetics is language, and, more concretely, the puzzling phenomenon of linguistic diversity and instability. This is a crucial issue if only because language appears to be the most important vehicle of memes. The case for considering language itself as a memetic phenomenon has been put forward with robust, albeit counterintuitive arguments. But construing language as a monolithic competency for which a single origin is identified, or whose essential "nature" is defined, might rest on a fallacy generated by millennia of mythic and philosophical speculations. It might not make sense to look for a single, coherent origin of language, memetic or otherwise. Furthermore, two centuries or so of "scientific" (both formalistic and empirical) analyses of particular languages have led to categorizations and generalizations most of which remain problematic, and still can be only loosely related to actual brain states. Attempting to understand (and memetically explain) language through these filters might be an impossible task. Modern linguistics has determined various levels of reality for the apprehension of language, which all rest on the assumption of absolute functionality. This latter assumption is questionable.

11. It appears that the linguistic paradigms that map contemporary epistemology have greatly influenced the early speculations on hypothetical memes. Linguistics has focused its efforts on language-objects and the properties of individual utterances rather than on the social networks that are a prerequisite for the very existence of any language. In fact, it is only through a drastic methodological reduction that any linguistic phenomenon can be examined as a free-standing entity. Socio-linguistics has addressed variables that are mostly peripheral influences such has how language is a marker of social class, or how fashions impact various aspects of language. But it seems difficult to conceive language independently of social networks. Both are integral parts of a single phenomenon. This is obviously also true of memes. Any advances in the understanding of the phenomena that the notion of meme tries to capture will require a more comprehensive theory that would include social networks as one essential dimension.

12. The form of memes. To be scientifically studied, as opposed to being philosophically discussed as a concept, memes must have distinctive forms that meet a certain number of criteria. These criteria must be determined by consensus among a sufficient population of researchers in several relevant disciplines. This does not appear to be the case yet. In the meantime, memes can be described heuristically in two ways. First, as concrete behaviors and their neurological correlates. Second, as algorithms that generate these behaviors. The crucial question is how to determine the features that will qualify a behavior as being memetic, and what exactly can help to distinguish it from non-memetic behaviors. A certain number of criteria can be, and have been used such as whether a behavior that spreads among a population is adaptive or not for this population or its individual members. Of course, assessing fitness is often problematic even if inclusive fitness is part of the picture. It may depend on the time scale with respect to which the assessment of fitness is made and how inclusive it is meant to be. Moreover, some behaviors may be

neutral as far as fitness is concerned regardless of the time scale. But it is also the case that a behavior can be adaptive in the short term and maladaptive in the long term. Moreover a maladaptive behavior may result from the fact that natural selection is not necessarily optimal but favors only statistically sufficient adaptations to the challenges of the environment. In addition, such assessments may be skewed by the modern mobility of populations that migrate to environments (and cultural niches) markedly different from the ones in which they have biologically and culturally adapted over long periods of time. Are there nevertheless plausible criteria that would make it possible to determine that a particular class of behavior is memetic in the sense that it runs counter to the fitness of a population? Naturally, it is conceivable that a memetic behavior might happen to be adaptive and enter in a symbiotic relation with the population among which it spreads. But the latter is practically impossible to demonstrate, and only evidence of the former would provide a robust argument for the capacity of some algorithms to replicate for their own sake in human brains as parasitic behaviors that are squarely ill-adaptive for their hosts. So far, only anecdotal evidence has been presented.

There are nevertheless some well documented examples of the disastrous spreading of ideas among vast populations. The triumph of Lysenko' s Lamarkism in the Soviet Union (as well as in Maoist China), and the disastrous famines it caused is an example that comes to mind. But this remains at an anecdotal level and other explanations are plausible besides a memetic one. However, if the memetic hypothesis were to be explored, it would seemingly boil down to observing that a narrative was at the root of this collective behavior. Any theory, foundational myth, or creation of rules and norms can be shown indeed to implement a narrative algorithm. There can be, of course, other kinds of algorithms such as those which generate gestures in a totally non-verbal context, and which have been shown to be mediated by mirror-neuron systems. There are also acoustic algorithms, some of them musical, that "invade" the brain. But they can be considered as a special kind of gestures.

It seems reasonable, at least as a first methodological step, to focus on a particular class of narratives which have the capacity of mobilizing the cognitive and emotional resources of the human brain and lead it to actions that are indifferent to the fitness of the behaving agent. One of the reasons for selecting narrative algorithms as a point of entry into memetic research is that narratives have been intensively studied from a formal point of view by several branches of semiotics during the previous century. Parts of these algorithms can mutate in the course of their transmission. These studies can provide at least a conceptual platform from which to launch a truly scientific inquiry into the power of stories (all theories can be demonstratively shown to have a narrative structure, e.g., the Big Bang) and the compelling dogmas and slogans they usually spawn. Another reason that would make this methodological choice felicitous is that the cognitive neurosciences have paid a great deal of empirical attention to the way in which narratives are preserved as well as transformed in memory.