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Memes, genes, and signs: Semiotics in the conceptual interface of evolutionary biology and memetics

https://doi.org/10.1515/sem-2018-0016

Abstract: In 1976, Richard Dawkins coined the term *meme* as a way to metaphorically project bio-evolutionary principles upon the processes of cultural and social development. The works of Dawkins and of some other enthusiasts had contributed to a rise in popularity of the concept of memetics ("study of memes"), but the interest to this new field started to decline quite soon. The conceptual apparatus of memetics was based on a number of quasi-biological terms, but the emerging discipline failed to go beyond those initial metaphors. This article is an attempt to rebuild the toolkit of memetics with the help of the more fundamental concepts taken from semiotics and to propose a synthetic conceptual framework connecting genetics and memetics, in which semiotics is used as the transdisciplinary methodology for both disciplines. The concept of sign is used as the meta-lingual equivalent for both the concepts of gene and meme. In the most general understanding, sign is a thing which stands for another thing. In genetics, this translates into gene that is a section of DNA that stands for the algorithm of how a particular biomolecule is built. In memetics, the similar principle works in meme that is a thing that stands for the rules of how a particular cultural practice is performed.

Keywords: genetics, memetics, semiotics, memes, logonomic signs

1 Introduction

In 1976, evolutionary biologist Richard Dawkins proposed the term *meme* as a way to metaphorically project bio-evolutionary principles upon the processes of cultural and social development. In the book *The Selfish Gene*, he argued that evolution is the general principle that is applicable to all life in the universe, so

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genes that are involved in the evolution of species are not unique and there can be evolutionary processes that involve other *replicators* but follow the same general pattern. It is in this context that Dawkins proposed to use the word *meme* to refer to elemental units of cultural replication:

> I think that a new replicator has recently emerged on this very planet ... It is still in its infancy, still drifting clumsily about in its primeval soup ... of human culture. We need a name for the new replicator, a noun that conveys the idea of a unit of cultural transmission, or a unit of *imitation*. 'Mimeme' comes from a suitable Greek root, but I want a monosyllable that sounds a bit like 'gene'. I hope my classicist friends will forgive me if I abbreviate mimeme to *meme*. If it is any consolation, it could alternatively be thought of as being related to "memory," or to the French word *même*. (Dawkins 2006: 192)

According to Dawkins, memes are entities that are "capable of being transmitted from one brain to another." They are, for example, tunes, ideas, catch-phrases and clothes fashion, as well as "ways of making pots or of building arches" (Dawkins 2006: 192). In his explanations about memes, Dawkins often used various metaphors to describe the "behavior" of memes, saying that they are "parasites," "viruses" or other "selfish" living creatures "leaping from brain to brain," "drifting clumsily about" in the "primeval soup" of culture and competing with each other.

At the end of the twentieth century, the works of Dawkins and of some other researchers and enthusiasts (Dennett 1993; Lynch 1998; Hofstadter 1986; Brodie 2011) contributed to a rise in popularity of the concept of *memetics* that stood for the "study of memes." In the conceptual apparatus of that new science, some quasi-biological terms were invented, e.g. *meme infection*, *meme allergy*, *vaccime* (sic), *immuno-meme*, *memetic immuno-depressant*, *meme dormant*, etc. (Grant 1990) There were also many word plays around the gene-meme assonance that gave birth to such neologisms as *meme pool*, *memotype*, *phemotype*, etc.

In general, according to Blute (2005), when it comes to the core metaphor of memetics, there are two main opinions among memeticists. The first one is the *gene-like view* in which memes are seen as coding elements that provide effective accumulation and transmission of information in the processes of sociocultural evolution. The second perspective is that of *virus-like view* in which the emphasis is put on the examples of our culture "parasitizing" on our biology.

Memetics itself turned out to be a quite viral meme, but also a rather short-living one. The interest and excitement about this concept lasted for a couple of decades and then started to decline. The new evolutionary science of culture seems to have failed to go beyond its initial metaphors and word plays. In this article, I will try to find a way to rebuild the apparatus of memetics by developing the terms of memetics that can still be productive in the evolutionary

studies of culture with the help of the more fundamental conceptual framework of semiotics.

2 The discredited label

In the period when memetics was gaining popularity, there existed a journal that was supposed to be a platform for scientists and professionals to discuss their views and research in memetics. It was called *Journal of Memetics – Evolutionary Models of Information Transmission*. Quite illustratively, that journal that was launched in 1997 was terminated in 2005. In one of the articles that were published in its last volume Bruce Edmonds, one of the editors, stated that the idea of memes "has not provided any 'added value'" in terms of producing a *new* understanding of phenomena. However, at the same time, even Edmonds agreed that evolutionary approaches to communication could still work in other frameworks, but without appealing to memes and to the "discredited label of memetics" (Edmonds 2005).

I suggest that memetics faced the crisis not because of the defect in the very idea of evolutionary cultural research, but due to the irresponsible and sloppy use of biological metaphors by some memetics enthusiasts. Maybe it is because the project of memetics just attracted more people who were more interested in the plays on words than those who were interested in the serious research. The result is well described by Edmonds: those who sought to study memetics in serious ways "suffered in the respect that they are often confused with those on the penumbra for whom memetics is a fad." Another reason for the failure of memetics was probably that while the supporters of the new discipline did put much attention in playing with the metaphorical interface between memetics and genetics, they were not that enthusiastic about finding a way to integrate memetics' framework with the existing disciplines of cultural studies (Kilpinen 2008: 219).

However, it is also important to notice that even though Dawkins and his followers succeeded in popularizing the evolutionary approach to culture, they were neither the first[1] (James 1880; Jahoda 2002: 56–58), nor the last ones (Jablonka et al. 1998; Henrich et al. 2008; Sasaki 2013; Cousins 2014) to explore

1 Even the word *meme* is probably not so new, since a like-sounding German term *Mneme* was coined a century before (Kilpinen 2008: 218; Laurent 1999; Semon 1904, Semon 1921; Shifman 2014: 10). Besides, there is a series of other terms that were proposed to label cultural "genes," e.g. *mnemotype, idene, symbol, sociogene, culturgen, idea,* etc. (Jahoda 2002: 56).

this domain. And it is quite obvious that even though a gene-meme analogy and other biological metaphors was not enough to provide a functional research framework, so the task of building a conceptual framework for transdisciplinary evolutionary research of cultural and social evolution is still on the table, regardless of whether we call it memetics or use some other term.[2]

3 Memes versus signs

As I have already mentioned above, one of the possible reasons for the failure of memetics was its detachment from other disciplines that study the processes of information transmission in culture (Jahoda 2002; Kilpinen 2008). One of those disciplines is semiotics. And in some aspects, the ambitions of semiotics and memetics are rather similar,[3] as both disciplines seek to become a meta-language of the studies of culture (Morris 1938: 2; Dennett 2001: 309). However, Richard Dawkins gives no references to semiotics neither in *The Selfish Gene*, nor in *The Extended Phenotype* (Dawkins 1976, Dawkins 1982). So probably the first encounter of semiotics and memetics is the fragment from Thomas Sebeok's *The Sign and Its Masters*, published in 1979. That comment, given by Sebeok, about the theory of memes was quite positive, as he called Dawkins's concept of replicators a "nice idea." Sebeok cited a piece from Charles Peirce's writings (CP 2.222) and presented some of his own views that are rather close to those of memeticists':

> The fundamental property of life belongs inalienably to signs, as 'every symbol is a living thing in a very strict sense that is no mere figure of speech' ... Replicators – Dawkins's name for genes – are, in the last analysis, but signs that construct for themselves survival machines (containers, vehicles) to assure their continued existence. (Sebeok 1979)

In his later works, however, Sebeok was much more negative about memetics, saying that "Dawkins' case is, at its core, a deceptive one" (Sebeok and Danesi 2000: 163–164). And the reason for the change in Sebeok's attitude, as Erkki Kilpinen supposes, was not only the dissatisfaction with the notion of meme

2 In Mesoudi et al. (2006) it is suggested that memetics is just one of the elements in the system of disciplines on cultural evolution that also includes comparative and cultural anthropology, evolutionary archaeology, gene-culture coevolution studies, psychology, economics, behavioral ecology, and neuroscience.

3 It is also quite indicative that one of the main cleavages inside memetics that is the dispute of *externalists* and *internalists* (Vada 2015: 2) is similar to the cleavage between Peircian and Saussurean views on semiotics.

itself, but rather the uproar that it has aroused, combined with the fact that Sebeok had been talking about replication in biology and culture ten years before Dawkins (Kilpinen 2008: 231). As Kilpinen puts it:

> It is no shame but an honor to be the second man to the South Pole, but such a man should not claim to have been there first. Dawkins made such a claim, but apparently in good faith, he seems to have been unaware that universal replication was something that others had by that time begun to take for granted. (Kilpinen 2008: 231)

Sebeok, of course, was not the only semiotician to criticize Dawkins' ideas from the semiotic perspective. Detailed analyses of the category of meme from the point of view of semiotics were also presented by a number of other researchers (Bouissac 1992, Bouissac 2001, Bouissac 2007; Deacon 1997, Deacon 1999; Kull 2000; Maran 2003; Kilpinen 2008; Jiazu 2009; Maran and Kleisner 2010; Tønnessen 2012; Bennett 2015; Cannizzaro 2016; Schaden and Patin 2017). The most common point of those criticisms is that *meme* is just a new word for the semiotic concept of *sign*. But even though this argument seems to lay on the surface, there are various nuances to it and some important conclusions that can be drawn from it. For example, a quite productive version of the meme-sign equivalence was proposed by Terrence Deacon. According to Deacon, memes are equivalent to the entities called *sign vehicles*. And if we agree that memes are sign vehicles, that means they are "not some intangible essence that is passed from brain to brain," but rather concrete things or events that represent some information. Taking this perspective, Deacon criticizes Dawkins for "a misplaced agency" in both "gene's-eye" and "meme's-eye" views of evolution:

> [T]hat gives the impression that both genes and memes – replicators – can be understood without considering their embeddedness in a dynamic system which imbues them with their function and informational content ... Genes and memes are not the locus of the replication process, nor are they somehow the functional unit of information. They are replicas not replicators. They are rather more like the concretion of information bottlenecks in a system. (Deacon 1999)

According to Deacon, the very concept of *replicator* is misleading, as it inherited from the "short-circuited description of information processes in biology." This description would suggest that certain important aspects of information processing "can be treated as merely derivative from the replicator concept" and thus "inverts the reality." And it is from this misleading understanding that the anthropomorphic metaphors of memes' and genes' "selfish behavior" emerge. Besides, it is because of this understanding that the virus-like branch of memetics develops, as it is only in the degenerate case of viruses that the function of a pattern is its mere self-replication (Deacon 1999).

However, divesting the meme from its virtual agency does not mean that the whole concept has to be discarded. As Deacon suggests, memes (and genes) can be understood as "the physical loci where the replicative and adaptational functions intersect." The information for both functions is not fully contained in the meme but is constituted by the relationship between the physical pattern of the token and the system of processes in which it is embedded (Deacon 1999).

An alternative view of how the concepts of meme and sign correspond to each other was developed by Kalevi Kull (2000). Kull proposes a framework in which these terms are seen as concepts belonging to two different biological paradigms that are *mechanistic biology* and *semiotic biology*. And the meme, being "a degenerate sign" in which only its ability to be copied remains, is the equivalent of sign in the paradigm of mechanistic biology.

The main principle of cultural development, according to Kull, is not reduced to imitation, even though it can look so from the perspective of mechanistic biology. In the semiotic biology paradigm that main mechanism is not mere copying, but translation.[4] And, as Kull puts it, "the objects of copying are memes, whereas the objects of translation are signs":

> [B]oth terms denote almost the same thing, and accordingly it would be easily possible to lend mutually the brilliant examples — still emphasising the different sides of the coin, in one case the ability to propagate and compete, with all their consequences, in the other case the relatedness to creativity and symbiosis. However, if organisms would only copy information and not translate, i.e. not change and transform information like it always take place in the process of translation, then they would never be able to predict, to expect, to intend, i.e. to live. (Kull 2000)

Kull also adds an argument, similar to that of Deacon's, saying that separate sign by itself "does not live," but signs are always connected to a living system (Kull 2000). And for cultural signs it is culture that is the living system in which they are built in. And so cultural signs live only as components of the living cultural system.

4 According to Kull, it is true not only for the cultural processes but in biological as well:

> Building the phenotype on the basis of interpretation of genotype can be named translating only if the phenotype is further used for the producing of next genotype. Actually, this is the case, if we take the phenotype as a process, as a developing organism. Otherwise it would be a dead end. (Kull 2000)

4 Genes, memes, and signs

In this article, my goal is not to present another semiotic critique of memetics, but to take the existing criticisms into account and to outline a possible interface to bridge these two disciplines. For this purpose, I will try to propose the interdisciplinary system of concepts in a form of a dictionary that, I hope, would provide a more coherent mechanism of conceptual transfer between memetics, semiotics, and genetics.[5] I believe that it is possible to build this kind of interface in a way that the conceptual apparatus of three disciplines function effectively together, complementing each other and compensating each other's deficiencies.

As a starting point, I take the idea that the concept of *sign* is the meta-lingual equivalent[6] for both the concepts of *gene* and *meme*. In the most general understanding, *sign* is "a thing which stands for another thing" (W 3: 76, CP 7.355). So in genetics, this translates into *gene* that is a section of DNA (or RNA) that stands for the algorithm of how a particular biomolecule is built.[7] In memetics, the similar principle works in *meme* that is, as I propose to define it, a thing that stands for the rules of how a particular social and cultural practice is performed.

It is crucial to point out here that the word *thing* in this definition of *meme* must be understood in the broadest meaning, including all possible modes in which various social regulations can be transmitted, including events from which particular practices can be copied. It is also essential that, if defined this way, memes are understood not as just any signs of culture in any situations, but only when those signs function as "laws," "instructions," "blueprints" or examples for further social semiosis. So memes are not just any signs, but the signs that constrain communication and social behavior.

5 My work on this dictionary was largely inspired by Werner Patzelt's attempt to develop a similar genetics-memetics vocabulary in the framework of evolutionary institutionalism (Patzelt 2007).

6 I often use the rather vague word *equivalent* when I speak about the concepts from the vocabularies of semiotics, genetics, and memetics that are similar to each other, as I am leaving open the question, if those dyads and triads are *analogies* or deeper similarities based on some *shared fundamental principles*.

7 At the same time gene is a part of the molecular machine performing that algorithm. For a more detailed semiotic account of genome see (Zolyan and Zhdanov 2018).

5 Memes as logonomic signs

If we put it in terms of social semiotics, another name for *memes* is *logonomic signs*, as they are the elements of *logonomic systems*. Those systems, as Robert Hodge and Gunther Kress define them, are sets of "rules prescribing the conditions of production and reception of meanings; which specify who can claim to initiate (produce, communicate) or know (receive, understand) about what topics under what circumstances and with what modalities (how, when, why)" (Hodge and Kress 1988: 4). Hodge and Kress also mention that "a logonomic system is itself a set of messages" (Hodge and Kress 1988: 4). It is those messages that I suggest to call *memes*.

Even though I find quite productive Deacons' idea to correspond the concept of *meme* to the concept of *sign vehicle*, I don't think that there is a chance that is will be coherently used in that strict sense by many people. That is why I propose to equate *meme* to *sign* as a whole, but then we can still distinguish between *meme vehicle*, *meme interpretant* and *meme object* (cf. *vehicle*, *interpretant* and *object* in Peircean semiotics). However, in that case meme "mutations" can be not only the changes in the meme vehicles, but also in their relations with interpretants and objects.

I believe that my version of meme-sign correspondence has a chance to be fruitful, as it opens an opportunity to import some of the basic semiotic categories into memetics, giving it a more nuanced and systematic analytical framework. For example, if we understand memes as signs, we are able to transpose the basic semiotic distinction of *semantics*, *syntactics* and *pragmatics* (Morris 1938) on memes. This gives us the basic set of dimensions of meme analysis, including:

- *meme semantics* (the study of relations between meme vehicles, interpretants and objects),
- *meme syntactics* (the study of relations between memes),
- *meme pragmatics* (the study of relations between memes, their interpreters and environments)

It can also be productive to distinguish between *iconic*, *indexical*, and *symbolic* memes, as the principles of representation of logonomic rules can be different. However, all three kinds of memes are often used not exclusively, but complementarily. For example, in the interaction between a trainer and a trainee, verbal instructions (symbolic memes) are combined with demonstrations (iconic memes) and trainer's bodily actions adjusting trainee's movements (indexical memes).[8]

8 An example of how such combinations of iconic, indexical, and symbolic memes is used in surgical training can be found in (Bezemer et al. 2012a, Bezemer et al. 2012b).

6 Memotypes, phemotypes, and meme pools

One of the deficiencies of memetics that was pointed out by different researchers (Deacon 1999; Knudsen and Hodgson 2006) is its inability to meaningfully import from genetics the distinction between genotype and phenotype. And even though the words to describe that distinction were invented (*memotype* and *phemotype*), it was indeed quite difficult to find a way to fully transpose this differentiation, especially with the fact for the evolution of culture it is typical to transfer information horizontally ("Lamarckian inheritance"). Nevertheless, I think, it is possible to propose definitions for *memotype* and *phemotype* that are productive. The way to do it is to transpose to memetics one of the central distinctions of semiotics and linguistics that is the distinction of *langue* and *parole* (Saussure 1995: 23–32).

The essence of this distinction is in differentiating between the abstract system of principles of communication (that is called *langue*) and the concrete instances of use of this system (that is called *parole*). On the level of *discourses* (that are context-specific languages[9]), this dichotomy transposes into the distinction of *discourse program* (context-specific langue) and *discourse product* (context-specific parole; Ilyin 2006: 94; see also Dijk 1997: 3–4).

So how can we make sense of these distinctions in memetics? First of all, we can define *meme pool* as the memetics' equivalent for *langue*.[10] So if *meme* is a thing that stands for the rules of how particular social and cultural practices are performed, *meme pool* is the whole set of those rules available. In that case, *memotype*, being the equivalent of *discourse product*, can be defined as a configuration of those rules applied in particular situation. Then *phemotype* can be understood as the concrete form of practices performed in a particular setting, based on the memeotype. Thus the semiotic equivalent for *phemotype* is *discourse product*.

The proposed definitions of memotype and phemotype are not only an attempt to invent some kind of distinction that is comparable to that of genotype and phenotype. It is also a way to respond to some other criticisms towards memetics, as this understanding of memotype and phemotype gives a place not only to simple replication, but to translation and interpretation as well, since the conversion between discourse program and discourse product does not have to be mechanistic imitation, but can be creative and interpretative. There is

9 Even though the original Saussurean distinction of *langue* and *parole* was proposed in the context of linguistics, I use it here in a broader meaning, speaking not only about natural languages but about all sign systems.

10 The memetics' neologism, paired with biological *phene pool*, is *pheme pool*. Their semiotic equivalent would probably be the concept of *parole*.

actually even a special concept of *discourse converter* that can be used to describe the interface in which a *product* is produced on the basis of the program (Ilyin 2006: 94; see also Buyssens 1942). And it is exactly this *discourse converter* that is the semiotic equivalent of *organism*. In the vocabulary of memetics there seems to be no suitable equivalent, so I would suggest my own term *meme converter*.

Besides, by systematically introducing the semiotic categories of *langue*, *parole* and *discourse* into the apparatus of memetics we can overcome the separation of the existence of signs from the life of larger systems. If the concepts of meme pool, memotype and phemotype are defined in the way presented above, this will provide a language to speak about how individual memes function in larger sign systems. As Deacon notices, the lack of that connection is inherent in memetics and is one of its major defects (Deacon 1999).

7 Between semiotics, genetics and memetics

An attempt to sum up the definitions of memetics' terms that were proposed above and to show how they correspond with the terms of genetics and semiotics is presented in Table 1.[11] In my view, this genetics-semiotics-memetics dictionary gives an opportunity to develop the vocabulary of memetics in a way that will bring it beyond its initial quasi-biological word plays towards a more responsible use of metaphors and a more substantial understanding of its key terms. It provides a more coherent parallel vocabulary of genetics and memetics and, besides, helps semiotics to develop its transdisciplinary potentiality to function as a meta-language for both genetics and memetics.[12]

11 The descriptions of some concepts of genetics and semiotics in the table may look too generalized (or even over-simplified) for the specialists. It was, however, the intentional strategy in this vocabulary to loose as much specificity as possible and to focus only on the most general components of meaning, since in the comparison of this scope leaving too many (sub)disciplinary nuances of definitions would be analytically counter-productive.

12 Erkki Kilpinen emphasizes that *meme* is not just a newer word for *sign*, but an "inferior" alternative to it, as it opens wider the cleavage between the studies of nature and culture, while semiotics attempts to overcome it (Kilpinen 2008). In this article, I try to show that semiotics is indeed capable of bridging the gap between natural and cultural, by using it as a meta-language for both memetics and semiotics. However, I do not think that the fact that memetics' apparatus is less general than that of semiotics can be in itself an argument against memetics. In my view, it is more of a question of what tools we, as researchers, choose in particular situations. I believe that the most productive strategy is to combine the use of specialized

Table 1: The interdisciplinary dictionary of genetics, memetics and semiotics.

Genetics	***Semiotics***	***Memetics***
Gene a section of DNA coding and regulating the building-up of functional biomolecules	*Sign* a thing standing for some other thing	*Meme* a thing coding the rules of how particular practice is performed
Gene Pool all the genes of a species	*Langue* all the available rules of signs use	*Meme Pool* all the available rules of how practices are performed
Genotype a configuration of the genes in a particular organism	*Discourse Program* a configuration of rules of sign use applied in a particular context	*Memotype* a configuration of rules that is applied in a particular situation to perform a particular practice
Phenotype a concrete shape that an organism assumes on the basis of its genotype and under influence of environment	*Discourse Product* a concrete form of sign use in a particular context	*Phemotype* a concrete form of practices that are performed in a particular situation

And it is not only memetcs that can benefit from this kind of interface, but semiotics as well. Here I do support Terrence Deacon's idea that what classic semiotics, being mostly synchronic and descriptive, probably lacks is the understanding on "why certain signs persist and others do not" or "why certain semiotic systems evolved the forms they now exhibit." And the theory of memetics has a potential to compensate that deficiency by becoming an interface between the studies of sociocultural evolution and semiotics. If this attempt succeeds, it will bring us closer to a more integrated methodology for social studies, as well as to a more potent and transdisciplinary semiotics.

In one of his early writings, Charles Peirce proposed to distinguish between three main scientific domains: the *science of things*, the *science of forms* and the *science of representations* (W 1:303; MS 108). In this idea, I think, there is a hint about what can be the place for memetics in the system of sciences, as this emerging discipline can be developed as an interface between the domains of *semiotics* ("the science of representations") and *morphetics* ("the science of forms"). Or, to be more

conceptual tools like those of memetics with the broader transdisciplinary apparatus of semiotics.

precise, it can function as a junction of their specialized ("thick"[13]) versions that are *social semiotics* and *evolutionary sociocultural morphology*.

I have to admit that scepticism and "allergy" towards *memetics* is probably too strong and maybe this very brand will be discarded,[14] I, nevertheless, strongly believe that in some form or another the discipline of the *semiotics of sociocultural evolution* as a part of the synthetic *evolutionary science* has to be developed. And this task requires further work of integrating the concepts of general and social semiotic studies with insights from the studies of biological and cultural evolution.

Funding: This work was supported by the Russian Science Foundation (Grant Number: 17-18-01536).

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13 See a more detailed discussion about *thick* and *thin* versions of the three "sciences" in Ilyin et al. (2017).

14 There is one more problem with memetics that will probably lead to this brand being abandoned. It consists in the fact that the term *meme* was "hijacked" by popular internet culture (Dawkins and Solon 2013) and is now mostly used to refer to the "viral" photos of cute cats, popular YouTube videos and "image macros." In this context, the serious use of the word *meme* in science seems to be even more problematic.

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