

THOUGHTS ON THE DISTRIBUTION OF THOUGHTS: MEMES OR EPIDEMIES*

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We are victims of an illusion that makes us believe that we have created what actually grasps our volition from without.

Durkheim: *The rules of sociological method*

(1895/1982, p. 13)

Abstract. The paper starts from a general consideration of three programs in cognitive science: the internalist, the externalist, and the social approaches to cognition. In the social domain, some new approaches propose that human sociality is to be treated as part of our biological nature. Several research programs were born out of these considerations. There are some among them that propose general theories for the distribution of representations. The paper analyses two of these, the meme theory put forward by RICHARD DAWKINS, and the epidemiological theory proposed by DAN SPERBER. It points out that while for DAWKINS the essential aspect is replication, for SPERBER it is transmission of representations where biological analogies become crucial. For both theories, to turn them into working models, a lot of detailed elaboration is needed from data on social science.

Keywords: memes, epidemiology of representations, social patterns and evolution

THREE PROGRAMS FOR COGNITIVE SCIENCE

Contemporary cognitive science has several alternative general research programs that interpret the key notion of cognitive science, *representations* from different perspectives. A possible scheme for this classification is given in *Table 1*.

The internal horizontal approaches study *relations among representations*. Several traditional disciplines belong here, like logics, theoretical linguistics, and even experimental psychology, since they are all dealing with internal relations between thought processes. Among the philosophical views of present day cognitive

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Table 1. Different frameworks for cognitive science

A. Internal horizontal view (logics, psychology)	<i>Internal views</i>
B. Internal vertical view (cognitive neuroscience, psychophysiology)	
C. External horizontal view (external semantics)	<i>External Views</i>
D. External vertical view (social semantics)	

science this approach is represented by the Language of Thought program of JERRY FODOR (1975, 1990). In this view, a postulated Syntactic Theory of Mind is responsible for a comprehensive internal mental organization with implicational relations between representations. Recently, the purely internalist attitudes started to allow for a vertical biological interpretation of these regularities of thought processes, in the emerging field of cognitive neuroscience.

An *externalist semantics* supplements this view. According to this, the human mind considered as a symbol processing system is grounded in the real world due to perceptual processes. As STEVEN HARNAD (1990, 1996) proposes, human cognition has two layers: the symbols working by establishing relations between themselves need to have a perceptual grounding in the real world. However, a third attitude regarding representations is emerging that is referred to in *Table 1* as the External Vertical view. Its basic concern is not to learn how representations are tied to the physical world, but rather, what the relationship between representations entertained by individual knowing subjects is. The first subproblem here is a structural one: how similar are these representations to each other? The second subproblem is a genetic one: how does the harmonization of representation systems come along? A simple solution is offered by biological universalism: structural similarities are explained by biological uniformities. According to the program of *social cognitive science*, on the other hand, the key issue is the mutual impact between systems of representations entertained by different knowers. Even if one postulates – as many evolutionary psychologists would do – that architectural aspects of the mind are grounded in evolutionary biology, individual items of information somehow still have to get into the system and be similar to each other. This is the natural domain of traditional learning theory and sociology as well. My intention is to survey and compare two comprehensive theories of “social cognitive science” that both offer a new framework for the traditional issue of “the harmonization of representations”.

Representations in Cognitive Science and in Social Science

Thus, the three approaches to cognitive science differ from each other in concentrating on different aspects of representations. The social framework for representations in cognitive science can be interpreted relative to the more traditional issues of the history of European thought. These traditional issues are:

- what provides for harmony between representations, and therefore for the preservation of tradition;
- what provides for innovation in the domain of representations, how do new ideas, i.e., new representations come along at all; and
- how is the distribution of ideas and innovation influenced by social structure.

Any self-satisfied social scientist would react to this list that these are core issues of classical social science. Traditional historical linguistics for example, deals with the distribution and change of principles of language structure during the interaction between languages and peoples, or with issues like how certain words become popular. A classic question of sociology, on the other hand, is the regulation of the distribution of ideas by reference groups and opinion leaders, including social psychological theories about the impact of schemata and stereotypes on information processing.

These aims are still with us today. The theories entertained by cognitive science and evolutionary theory have a more unifying vision than traditional social theories. They are interested in issues like what makes it possible at all to have agreements between representations in a species characterized by competitions involving hierarchy on the social level, and cooperation entailing mental concordance. From an evolutionary point of view the human species has representations with a rather peculiar status that are parallel to the different models of cognitive science. As SPERBER (1997) presents it in his claims for a strongly individualistic cognitively based social science, it is in fact the *sharing of representation* that is making the crucial connection between individual minds. To put it in a more analytic manner,

- humans are hosts to representations, being constructors and carriers of intentional representation systems that are tied to the external world;
- representations are also tied to social communicative systems;
- they have a social intentionality: humans presuppose that their communicative partners are also carriers of representations.

Traditionally, the first aspect was referred to as thought, the second as linguistic thinking, and the third as being a social animal. Present day branches of cognitive

science with a social flavor treat the issue of representations as tied to communicative systems, or even cultures (DONALD 1991, 1993, 2001) and social intentionality (TOMASELLO 1999; CSIBRA and GERGELY 1998; CSIBRA et al. 1999) as being crucial to the human mind. Being a creator and a carrier of socially grounded representations would be a characteristic biological feature of humans, making good psychologists out of them (HUMPHREY 1976).

SOCIAL COHERENCE AS AN ISSUE OF HARMONIZING REPRESENTATIONS

Three Visions on the Relationships of Individual and Social Representations

Coherence between representations was interpreted in different ways in modern European traditions about the relations between individuals and society as presented in *Table 2*. The first two lines are traditional approaches while the third one is represented by the innovative biological based primary sociality theories.

Table 2. Three possible views on the relations between individuals and society

View	Role of individual	Role of society	Role of relationship	Characteristic authors
Individualism	Unbound	Constraining	Selectionist	DESCARTES, LOCKE
Standard social science	Bound	Constructive, source of values	Instructionist	DURKHEIM, Social behaviorism
Individualism	Becomes unbound	Grounded in primary social relations	Mutual sociality	BOWLBY, PIAGET, TOMASELLO, GERGELY

The first row of *Table 2* summarizes the individualism of European thought criticized by so many authors during the 20th century. Rationalists and empiricists shared the belief that

- there is something to be called eternal human nature;
- this can be studied on the individual level;
- society with its practice and superstitions distorts original human nature and in fact impedes its discovery.

In its liberating Enlightenment varieties this belief in eternal human nature and universal cognitive powers had a natural ally in primary motivating systems to provide a solid foundation for natural law. Starting from this conceptual platform, the approach lead a constant campaign against mystical certainties and oppressive moralizing traditions.

The issues Enlightenment was facing in this regard could be characterized in present day terminology as the issue whether society embodies an instructionist or a selectionist control over individual representations. GARY CZIKO (1995) phrased this dilemma as being valid for all sorts of changes in knowledge. What are the possible sources of these changes? CZIKO differentiates three views. In *providential views* ready-made knowledge comes from omniscient external sources. In *instructionist views* new knowledge is built up in a stepwise manner from outside resources like in traditional scholastic instruction. Finally, in *selectionist models* the sources for new knowledge are to be found within the system itself, and external agents, such as schools, society, social environment only select among the possibilities generated internally. Regarding representations these three versions roughly correspond to radical nativism, standard social science with its implicit radical empiricism, and different varieties of epigenetic selectionist models.

TOOBY and COSMIDES (1992), as well as PINKER (1997) apply a similar rough caricature to underlie the dominant views that formed the negative counterimage for an evolutionary vision on society. In their interpretation a Standard Social Science Model (SSSM) took shape in the early twentieth century, in fact as a reaction against a presumed “shallow evolutionism”. Connecting evolutionary ideas with special studies was one of the ideas of positivist social science. Individual cultures, languages, and human varieties on the large were interpreted as developmental steps in the shaping of humanity. RICHARDS (1987) gives a very thorough survey of this classical Darwinism in social science highlighting the varied political commitments of the different actors. Across the board, this first Darwinian attitude carried the (unfortunate) social overtone that there are primitive cultures and languages, contrasted to developed modern ones. Modern social science took off from questioning this attitude. The emphasis on the equality of cultures and languages from Franz Boas on was overextended towards questioning any use of evolutionary theory applied to human society. This resulted in three features summarized by PINKER (1997) that are of interest to us.

- The human mind became interpreted as an unbound, general-purpose learning machine with no (biological) constraints.
- Cultures can differ radically from each other.
- These cultural differences and varieties do shape the formation of individual mental architecture.

This traditional SSSM view treats humans as entirely flexible beings, with a relativistic praise of the power of cultures. This vision had a variety that emphasized the role of *interactions* in implementing this cultural determination, from JAMES MARK BALDWIN (1894) through GEORG HERBERT MEAD (1934) and HENRI WALLON (1982), LEV SEMJONOVICH VYGOTSKY (1986) up to MICHAEL TOMASELLO (1999) as of today.

In this version, knowledge would be interpreted as inherently social, but it would become an integral part of the individual mind not through some unidentified process of social instruction, but rather through interactions with others.

Line 3 in *Table 2* alludes to those new approaches that assign sociality to the individual mind, and try to elaborate a theory of primary sociality that would not be at the same time instructionist in the sense of CZIKO (1995). These attempts usually rely on the analysis of primary attachment processes, the formation of a Theory of Mind, and the unfolding of intentional attribution in human infants. This is in line with the proposal of HUMPHREY (1976) that social pressures were the basic factors in the evolution of human mental architecture. (For some surveys see TOMASELLO 1999; CUMMINS and ALLEN 1998; GERGELY 2003). They all entertain a set of commitments towards the following.

- Humans are by necessity social beings, society itself being merely a modulation or a derived feature out of this primary sociality.
- The roots of this sociality have to be looked for in individuals.
- One can talk about emergent interactionism of a sort in this sense.

Two Rival Contemporary Models on the Distribution of Representations

What I referred to earlier as *social cognitive science* has three basic varieties. The leading and most interesting one is the genetic-structural view that tries to show elementary sociality in the unfolding of the mentality in human children (e.g., TOMASELLO 1999; GERGELY 2003) Another program is paleo-cognitive social reconstruction. DONALD (1991, 1993, 2001) and MITHEN (1996), among others, suggest that in the formation of human mental architecture social changes, like the appearance of social semantics in language, and the development of social imitation played a crucial role (BARRETT, DUNBAR and LYCETT 2002).

Finally, the third approach to social cognitive science tries to combine evolutionary ideas and models of how individual representations are distributed in a community. AUNGER (in press) in his paper with a very telling title – *Three Roads to Cultural Recurrence* – gives a vivid portrayal of how these different varieties of evolutionary inspiration can be classified. He shows clearly that there is non-trivial interplay between individualistic theories, on the one hand, that suppose some kind of external (i.e., social) selection, and social dispersion theories that suppose some kind of individualistic selection. For the individual selectionist visions of the mind social factors are strong candidates for being the relevant selective agents, as already proposed by BALDWIN (1894). For the models dealing with the spread of representations, the cognitive factors are the selective agents.

There are (at least) three causal mechanisms that can explain the recurrence of cultural traits. Recurrence can occur through 1) strong individual learning biases; 2) population level normalizing effects on what is adopted; and 3) replicator based inheritance. Each of these mechanisms is favored by a particular brand of evolutionary theorizing about human society. Evolutionary psychologists (EPs) advocate the first option, which emphasizes the ability of universal structures in the evolved mind to come up with the same responses to environmental conditions time and again. What explains cultural consistency over time, then, is evolved psychological decision making processes in the face of common environmental challenges (Tooby and Cosmides 1992). A group I call “cultural selectionists” (CSs) prefer the second option, which notes that even poor social learning abilities can still produce consistently shared features at the level of the group if there are widely shared psychological preferences for traits or the types of individuals from whom to acquire culture (Boyd and Richerson 2000b; Henrich and Boyd in press; Gil White 2001). The third option, based on replication of the same information from generation to generation, is the memetic position (Dawkins 1976; Blackmore 1999). In this scenario, the cultural features that keep popping up are the phenotypic expressions of memes, or cultural replicators, disseminating through the population via social communication. This variety in the possible explanations for cultural evolution is not generally recognized, nor do advocates of one position generally acknowledge the validity of others. (AUNGER, in press, p. 1)

The conclusion – namely that the three approaches mutually ignore each other – is very relevant and very telling. One purpose of this paper is to slightly soften this mutual ignorance. The other purpose is to compare two models proposed within the third variety, thus within what AUNGER calls “the dissemination models”. In contrast to the two other social evolutionary models, the ones dealing with the distribution of representations are not interested in the genesis of human mental architecture. Rather, they concentrate on token elements of cognition, and claim that independently of their content, they have an underlying social fabrication. Their basic research issue is the social cohesion as it is implemented in the *distribution of representations*. In a way, they are interested in how social factors act as selectors. There are two rival models in this domain. The better known is the infamous memetic theory of DAWKINS (1976, 1982, 1986, 1995), the other one is the epidemiology of representations claim made by DAN SPERBER (1985, 1987, 1994, 1996). They have some underlying common features that help us to portray them on the palette of cognitive science and social sciences as well.

- They both emphasize the *repetitive elements* of human thought.
- Their key problem is the *spreading of representations*.
- They both rely on *biological metaphors* in interpreting social phenomena.

The last element is really a sign of changing times. Many decades ago, the radical followers of DURKHEIM (1895/1982), the French sociologist school of psychology claimed similar ideas about the external sources that shape our mental content, and mental architecture as well. For them, however, the social scaffolding was genuinely, purely social (HALBWACHS 1925; BLONDEL 1928; about them see PLÉH 2000), while for the new varieties the sociality of all of our thought is grounded in biological models, or at least in biological metaphors. The use of biological metaphors is crucial, since while they concentrate on repetition and similarity in representations, they do not fit into classical sociologicistic modes of thought. Their basic mental template is not social control over representations. Rather, they use an inverted logic. The very societal level of organization came to exist in their interpretation through the workings of conservative mechanisms of distribution of representations. This essentially conservative mechanism that would assure social integration is interpreted to be part of human biological nature.

The Memetic Theory

The meme theory proposed by DAWKINS presupposes that there are identifiable units of *cultural replication* he calls memes. According to the simple definition given by DAWKINS a meme is “a unit of cultural transmission, or a unit of *imitation*” (DAWKINS 1976, p. 206). Memes have their own tendencies to replicate (“a cultural trait may have evolved in the way it has simply because it is *advantageous to itself*”, *ibid*, p. 214), though they basically survive if they increase our cultural fitness. We shall see later that in some cases they may even increase our overall fitness. The selection-related nature of memes was summarized by WILKINS (1998, p. 8) as a statement about memes as being replicators and also being subject to selection:

A meme is the least unit of sociocultural information relative to a selection process that has favorable or unfavorable selection bias that exceeds its endogenous tendency to change.

Many cultural items are subsumed under the term of memes, from silly tunes through religious ideas to scientific theories. Memes in a way can be interpreted as the external forces that shape the human mind. As DANIEL DENNETT points out about this interaction “The haven all memes depend on is reaching the human mind, but a human mind is itself an artifact created when memes restructure a human brain in order to make it a better habitat for memes” (DENNETT 1995, p. 365). Or in another form:

The memes that proliferate will be the memes that replicate by hook or by crook. Think of them as entering the brains of culture members, making phenotypic alterations thereupon, and then submitting themselves to the great selection tournament not the Darwinian genetic fitness tournament (life is too short for that) but the

Dawkinsian meme fitness tournament. It is their fitness as memes that is on the line, not their host's genetic fitness, and the environments that embody the selective pressures that determine their fitness are composed in large measure of other memes. (DENNETT 1998, p. 6)

Thus, memes enter the selection game, but their selective agents are mainly other memes. That is not simply an excursion of DENNETT. It is important to emphasize that DAWKINS himself does not treat his proposal as a straight biological theory of culture, rather as a way of using biological metaphors. In his original statement about memes DAWKINS (1976, Ch. 11), he has expressed his reservations about sociobiological theories of his time that intended to explain cultural altruism, for example, directly by kin selection mechanisms. DAWKINS proposed memes instead as a more flexible mechanism to explain cultural variability and coherence at the same time. The essential point of memes is the extension of the replicative model, as WILKINS (1998) points out in his historical treatment. In the interpretation of DAWKINS (1976) himself, genes should not be treated as the single and exclusive forms of evolutionary processes. A Darwinist, he says, should not limit himself to genes. In this interpretation, genes are mere analogies to cultural replication, i.e., to memes.

In fact, ever since DAWKINS first outlined his memetic theory three controversies show up in different forms and settings, from sympathetic considerations to serious social science challenges.

Controversies about Memes

The analogy issue. When talking about memes, are we on the level of analogies or identical mechanisms? Is the memetic way of talking part of universal Darwinism, or is it merely a part of the loose analogical models of social science? There is some controversy here, even among sympathetic interpreters. DENNETT emphasizes for example that: "Meme evolution is not just analogous to biological or genetic evolution... memes and genes... are just different kinds of replicators evolving in different media at different rates" (DENNETT 1995, p. 345).

Human creativity. From the first moment of its appearance, as DENNETT (1995, Ch. 12) points out, the meme proposal was questioned by social sciences and humanities as another theory that challenges human creativity. While the critical issue with sociobiology and its likes was their questioning human uniqueness, the issue with meme theory is a questioning of our autonomy and creativity, or, to put it in a more sympathetic mode, of putting them into their own place. DENNETT (1998, p. 12) even goes further, and claims that memes do not question human creativity, as a matter of fact, as soft as they are, they can be the guarantees of creativity, since there are some among them that favor creativity...

one of the most persistent sources of discomfort about memes is the dread suspicion that an account of human minds in terms of brains being parasitized by memes will undermine the precious traditions of human creativity. On the contrary, I think it is clear that *only* an account of creativity in terms of memes has much of a chance of giving us any way to *identify with* the products of our own minds. [...] among the memes we harbor are those that put a premium on identifying with just such a subset of memes! Lacking that meme borne attitude, we would be mere *loci* of interaction, but we have such memes – that is who we are.

Survival value and meme replication. Are memes by necessity replicating only if they contribute to biological survival? Not necessarily, as DAWKINS (1982, p. 110) himself sees when he talks about suicidal memes and the like. “The ultimate criterion for success in meme selection [is not] gene survival.” Memes, as DENNETT (1998) stresses in many places, are to be functionally interpreted in themselves, they have their own functional considerations. But certainly some memes like Biblical commandments do survive because they contribute to biological survival. All of this leaves a way for the social study of memes, since no one claims that any Lamarckian interaction would be present between the memetic and the genetic levels. It is the *content of the memes* that have a feedback value towards the survival of their carriers, towards the survival of cultures.

For a historical note it is worthy to mention that around the same time as DAWKINS proposed his meme theory in 1976, VILMOS CSÁNYI the Hungarian ethologist (1980, 1982, 1989) outlined a similar view in his theory about different levels of replication, and interpreted culture as a group level replication of *ideas* formed in the human brain. In his proposal, ideas were not unlike memes for DAWKINS. Thus, the attempt to extend the replication idea to culture became a favorite topic from the late seventies on, and continues to be with us ever since.

Replication, Transmission and Selection of Memes

The crucial element for DAWKINS is *replication*, not only regarding memes but in his general vision of life as well. As it is well-known in his provocative metaphor, organisms are mere carriers of genes, and natural selection is directed not to organisms, but to genes (DAWKINS 1976). Similarly, human individuals as carriers of memes would have no control over their memes as they have no control over their genes either. As DENNETT (1995, p. 346) put this application into a slogan, the not too appealing conclusion about the favorite domain of “memetics”, about science would be:

A scholar is just a library’s way of making another library.

Dennett elaborated this in a more careful manner as well.

... in the domain of memes, the ultimate beneficiary, the beneficiary in terms of which the final cost benefit calculations must apply is: the meme itself, not its carriers. This is not to be read as itself a bold empirical claim, ruling out (for instance) the role of individual human agents in devising, appreciating and securing the spread and prolongation of cultural items. It is rather a proposal that we adopt a perspective or point of view, from which a wide variety of different empirical claims can be compared, and the evidence for them considered in a neutral setting, a setting that does not prejudice these hot button questions. (DENNETT 1998, p. 8)

In the case of memes DAWKINS does not seem to care too much for the nature of the very *process of transmission*: “memes propagate themselves in the meme pool by leaping from brain to brain via a process which, in the broad sense, can be called imitation... If the idea catches on, it can be said to propagate itself, spreading from brain to brain” (DAWKINS 1976, p. 206). From the point of view of the elaborateness of his own theory, there is a lot to be asked for here. However, this loose portrayal of transmission leaves sufficient space left open for social science that studies the very process of this “leaping from brain to brain”.

As for the general model, it is not only his critics, like BOYD and RICHERSON (1985, 2000a,b) but even DAWKINS himself saw the limits of his analogies to begin with. On the other hand, he and some of his followers also see the power of this structural analogy. Most importantly, similar to systemic influences in genetic copying and recombination, one could imagine interactions between selection on given loci in the meme pool, too. Thus one can foresee a population memetics compared to population genetics. Here is a list of the considerations raised by DAWKINS (1976) that are still valid.

- The copying process in memes is most probably much less precise than in genes.
- Some Lamarckian feedbacks might be imagined. Recently this is interpreted in the light of feedbacks from the niche (LALAND, ODLING-SMEE and FELDMAN 2000), or the impact of culture created cranes, ideas and mental tools on our own development (DENNETT 1995).
- In meme selection an important factor is the presence of other memes in the meme pool. Selection favors memes that use their cultural environment to their advantage (DAWKINS 1982).

The issue that was immediately raised in connection with meme theory is how uniform *different cases of transmission* are? As DENNETT (1995) and WILKINS (1998) noted, the favorite examples of DAWKINS all come from the integration and spread of representations in science, though he also entertains ‘silly tunes’. It is important for him to make sure that meme-like transmission does not only work over lower types

of knowledge. Scientific notions, theories, and even paradigms would show the same principles as fashions in the sense that the imitative transmission pattern would be prevalent there, too. Of course if the scope is widened, there is space for real social science to come in regarding the actual distribution patterns. Let us survey the full scope of meme like transmissions in humans, as presented by WILKINS in *Table 3* for different sorts of evolutionary analogies. This is of course an extension of the models entertained by evolutionary epistemologists following POPPER (1972), when they treated different models of knowledge change on the basis of the same generation-selection cycle (CAMPBELL 1974, 1988) as portrayed in *Figure 1*. As a matter of fact, CAMPBELL (1974) summarized 10 different levels of use of the trial and selection notions along the lines of a Popperian evolutionary epistemology, from the trials of the paramecium through vicariating locomotion and imitative learning to science. This is what is simplified by DENNETT (1995) into his notions of Darwinian, Skinnerian and Popperian creatures, but this is what was already attempted by KARL BÜHLER (1922) in his theory about the three domains of selection (Instinct, Habit and Intellect). The details of this process are not relevant here (see about them PLÉH 1999). It is important, however, that the way WILKINS extends them goes along the line of the original late nineteenth century extensions where biological, mental, and economical phenomena were all treated in a selectionist framework.

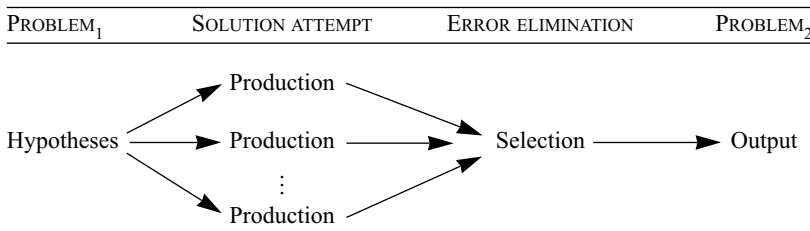


Figure 1. Knowledge change as generation followed by elimination according to POPPER (1972)

This involves the issue of human agency or activity. As again DENNETT (1995) reminds us, DAWKINS himself is far to see us at the merci of our memetic machinery. Humans can revolt against the tyranny of their own fate:

“We are built as gene machines and cultured as meme machines, but we have the power to turn against our creators.” (DAWKINS 1976, p. 215)

Table 3. Evolutionary analogues between different domains
(after WILKINS 1998, p. 14, simplified)

Entity (e) or process (p)	Biological	Memetic	Science	Language	Economic
Interactor (e)	Trait	PHEME	Experiment	Ling. behavior	Transaction
Replicator (e)	Gene	Meme	Theory	Morphemes	Account
Lineage (e)	Species, phylum	Traditions	Research program	Language group	Business, industry
Reproduction (p)	Organismic reproduction	New profile	Training	Language acquisition	New enterprise
Code (p)	DNA alphabet	Semantic	Semantic and mathematical	Grammar and lexicon	Currency
Encoding medium (e)	Amino acids	Neural structures, practices	Neural structures, journals, books, associations	Neural structures printing, writing, radio, internet, etc.	Neural structures, notes, receipts, bank files
Individual (e)	Organism, colony	Memetic individual	Scientist	Speaker	Economic agent

Selection and Memes

The first issue to consider within the domain of this analogy is what constitutes the *selectionist moment* in the case of memes? (Incidentally, this is a crucial issue for all extensions of Darwinism, since there are no easy analogues to selective reproductive success. This is a crucial issue for Neural Darwinism, as well, where EDELMAN (1987) tries to treat perceptual learning-like recycling phenomena as analogues to selection, they constitute what he calls “experiential selection”.) One option in the case of memes is the seemingly trivial interaction between the levels, the meme increasing the reproductive success of the meme carrying individuals. This would be a special case of gene-culture coevolution. It has a basic problem, as SPERBER (1996, p. 114) noted: “Gene-culture coevolution is... too slow a process to explain cultural changes in historical time.” In any case, the harmony between the two levels is only one possible type of relation, and as DAWKINS himself mentions mockingly, it could hardly explain the meme for celibacy. In general, memetic theory is forced to resort to seemingly self-explanatory courses of explanation. Memes, some of them at least, have a strong psychological attractivity, therefore they propagate. DAWKINS suggests that they are somehow having a good fit to the system of the other memes. But for DAWKINS, unlike the traditional Darwinian models, the essential point about representations and culture is not selection in the Darwinian model but rather the spreading of representations, i.e., replication.

One certainly feels here the danger of self-explanatory circularity: memes survive because they have a mysterious attractivity. DAWKINS himself sometimes gives the impression that through the process of *imitation* he tends to treat the spread of

memes as a runaway process. But for the critical social scientist reader, it seems to be that psychology is missing from the conception of DAWKINS. In fact, one of the advantages of SPERBER's theory to be discussed below is his emphasis on psychological factors in the spread of representations.

This line is taken up by SUSANE BLACKMORE (1999, 2000) who presents memetic theory as an intellectual follower of evolutionary epistemology. She treats imitation as central in the formation of the entire memetic enterprise. Imitation originally was an architectural selective process. Those individuals were selected during human prehistory who were especially good imitators. The initial moment of establishing cultural diffusion would thus be not the replication of *specific contents*, but rather the spreading of a *procedure*. This initial Darwinian selection would create the memetic field. Imitation itself, however, is rather a mechanistic copying for BLACKMORE. This is in variance not only with modern theories of imitation (see GERGELY, BECKERING and KIRÁLY 2002) but with earlier theories of CAMPBELL (1988) and even JAMES MARK BALDWIN (1894) who insisted on imitation itself being a selective process that has the initial function of shortcutting trial-and-error.

As a concluding remark for this chapter, it is worthy to note that while the meme proposal created a lot of popular enthusiasm, the real social elaboration is still to be seen. In fact, as DENNETT (1995, 1998) also notes, DAWKINS himself hardly ever goes to it. In his latest book (DAWKINS 1998) the only substantial thing he has to say is an agreement with the imitation proposal of BLACKMORE, otherwise he treats memes in a philosophical manner in the style of DENNETT as conceptual tools to dethrone human vanity about selfhood. On the basis of this self limitation, and the social science reaction to memes AUNGER notes in the preface to a book on Darwinian models of culture, that social science in fact treats memetics as either dangerous or superficial. This is witnessed by the lack of real progress in using the concept of memes:

The lack of subsequent development of the meme concept has been conspicuous. This stagnation implies that memetics is what the philosopher Imre Lakatos (1970) would call a "non progressive research program". In particular, there has been no extensive intellectual campaign to produce a general theory of cultural replicators. [...] little enthusiasm for the meme concept can be found among those professionally charged with understanding culture: that is, cultural and social anthropologists. Those in the fine arts are quite hostile as well. Jaron Lanier (1999), the inventor of the term "virtual reality", has argued that "the notion is so variable as to provide no fixed target. [...] Are memes a rhetorical technique, a metaphor, a theory, or some other device? Depending on who you talk to, they can be so wispy as to be almost nothing. [...] They make no predictions and cannot be falsified. They are no more than a perspective." Similarly, the famous skeptic Martin Gardner (2000) recently averred that "memetics is no more than a cumbersome terminology for saying what everybody knows and that can be more use fully said in the dull terminology of information transfer. [...] A meme is so broad

ly defined by its proponents as to be a useless concept, creating more confusion than light, and I predict that the concept will soon be forgotten as a curious linguistic quirk of little value.” In this view, the analogy to genes is deceptive. (AUNGER 2000b, p. 12)

Culture as an Epidemiological Pattern

If one starts from cultural processes, one can wonder what is more important in culture: replication of patterns and stability of culture, or the constant change? Should we take a PROPP–LÉVY-STRAUSS type of attitude to culture (LÉVI-STRAUSS 1958; PROPP 1958) with their emphasis on eternal repetitive patterns, structural stability, or should one take the ideas of eternal transformation as exemplified in the schematization theory of BARTLETT (1932) as the basic model of cultural diffusion? These two types of models – the replication and the transformation metatheories – show up as biologically inspired models as well. The rival pole contrasted to genetic models, among them to meme theory are the different varieties of “infection theories”. Some versions of this showed up earlier than the epidemiological theory, at the same time as DAWKINS’s meme theory. As HULL (1982, p. 311) put it, “Several authors have noted that sociocultural evolution looks more like contagion than evolution through selection”, but the “infection metaphor” should be taken as a metaphor, similar to the way memes are metaphorically similar to genes.

In traditional visions of a sociobiological kind (see the volume of CRAWFORD, SMITH and KREBS, 1987 for a comprehensive overview) the source and controller of cultural evolution is biological evolution. In the framework proposed by DAWKINS there are indications for an independent cultural level. “Neither evolutionary approach [sociobiology and memetic theory] gives too much space for cognitive mechanisms the existence of which are only treated as background conditions for the more or less autonomous choice of cultural features” (SPERBER and HIRSCHFELD 1999, p. 122). In the epidemiological theory of representations, a most characteristic rival theory proposed by DAN SPERBER (1985, 1994, 1996), the explanation of the diffusion of ideas is based on cognitive factors. SPERBER starts from a communicative metatheory, rather than an internalist organic metaphor. For him, the basic issue is the constant move of representations between the individual and the public form. This dual nature of representations (they exist in the human brain and in perceivable forms out there, as well) would be the key for his general dual materialistic vision of culture and thought. “... mental representations and types of public performances stabilized in this causal process of transmission [between individual and public representations] are recognized as culture” (SPERBER and HIRSCHFELD 1999, p. 122). The “infection metaphor” elaborated by SPERBER is the way he talks about the changes between public and private representations.

Everyday communication as well as social science is full of metaphors that compare the distribution of representations to that of *diseases*. We talk about “thought contagion” and “infectious ideas”. Nineteenth century bacteriology and social science also tended to see parallels between parasitic infections and the social diseases of human communities. These metaphors from the time of Pasteur and Zola on, have always emphasized the *negative aspects*, however: the similarity between human social “diseases” and epidemics. The negative metaphor is still with us: many cultural critics refer to media effects using virological metaphors. In the work of SPERBER, however, the epidemiological analogy loses its negative connotations: for him, epidemiology is a general mental model to talk about the distribution of representations.

Instead of the “social disease” metaphor, SPERBER goes back to another late nineteenth century issue of social epistemology: how can one have social patterns of the mind valid over large groups of humans, when at the same time society has no units carrying representations, there is no “group mind”, there are but individual nervous systems. For SPERBER the basic question is: how can we have social representations, when there are only individual minds? In his view, the relationships between individual and social representations are similar to the relationships between internal medicine and the epidemiology of diseases. Certain infections are subject matters for internal medicine if you study how they develop in individual organisms, but they are objects of study for epidemiology departments at the same time if you are interested in the patterns of transmission of the diseases. When you study the epidemiology of pneumonia, the epidemiological study does not create a new entity from individual pathology. Social sciences, like anthropology, social psychology, sociology would similarly be interested in the *diffusion of representations* that are originally formed in the individual mind, but doing this would not create new entities. Representations themselves exist in two material forms in this respect: as patterns in the individual nervous system, and as public signs in a physical format. Interindividual factors such as power, attraction, and opinion leaders do determine which direction representations spread and which representations tend to become popular. This is considered by SPERBER (1997, p. 130) in an openly individualistic metatheory of social science.

Epidemiology in the widest sense is the study of the way in which various conditions become distributed in population. The conditions considered may be physiological and pathological as in classical epidemiology; they could also be mental and “normal”.

A human population is inhabited by a much wider population of mental representations of all kinds: beliefs, values, techniques, projects, intentions and so on. These mental representations are distributed in the brains of individuals. Behaviors are caused by mental representations. The behavior of an individual, for instance

walking or speaking, may be perceptible to other individuals, or it may leave perceptible traces, for instance footsteps or writing. I will call such perceptible behaviors and traces “public productions”. The public productions of an individual may provide an input to the mental processes of other individuals, causing them to construct their own mental representations. These representations can in turn result in public productions, which can trigger the construction of yet other mental representations in other individuals, and so on. A human group is thus crisscrossed by a mesh of causal chains where mental and environmental links alternate. Everything social, I would argue, is caught in that mesh.

From the point of view of a proper understanding of the ambitions of SPERBER, it is worthy to emphasize that his theory in many regards is a reminiscent of DURKHEIM (1982). RAYMOND ARON (1967) stresses that for DURKHEIM sociology is an autonomous science since it has the same relation to individual psychology as biology has to inorganic studies, i.e., they have a non-reductive relation but at the same time no superfluous new entities are created. *Table 4* shows a modern summary of how Durkheim, the founder of modern sociology saw the relationships between physiology–psychology and psychology–sociology (NÉMEDI 1996).

Table 4. Parallels between the relations of physiology and psychology to the relationship between psychology and sociology according to DURKHEIM

Relation pairs	Traditional view	New view	Place of new science
Physiology	physiological	mental is the pattern of	nonreductive
psychology	reductionism	individual brain processes	independent psychology
Psychology	psychologism	social patterns over	nonreductive
sociology		individual phenomena	independent sociology

The key element both in the brain–mind and in the mind–society relationship is a non-reductive pattern based view: a century later this would correspond to the epidemiological vision developed by SPERBER. Higher organizations do not introduce new entities, but their laws are autonomous since they are laws of patterning over the lower level entities.

Let us take a closer look on how SPERBER develops his similar ideas!

The human mind is susceptible to cultural representations in the same way as the human organism is susceptible to diseases. [...]

Consider a human group. That group hosts a much larger population of representations. Some of these representations are entertained by only one individual for but a few seconds. Other representations inhabit the whole group over several generations. Between these two extremes, one finds representations with narrower or wider distributions. Widely distributed, long lasting representations are what we are primarily referring to when we talk of culture. There exists, however, no threshold, no boundary with cultural representations on one side and individual ones on the other.

Representations are more or less widely or lastingly distributed, and hence more or less cultural. So, to explain culture is to answer the following question: why are some representations more successful in a human population, more 'catching' than others? (SPERBER 1985, cited in SPERBER 1996, p. 57–58)

The search for this answer is supported by the epidemiological metaphor. "...one can have an epidemiology of representations. But whatever 'epidemiology' one is considering, it has to be defined in relationship to some sister discipline" (*ibid.*, p. 60). Most importantly, in the social variety of epidemiology SPERBER develops, the infectious agents (ideas) change at every interaction with an individual cognitive system.

What psychology is to epidemiology of diseases, psychology of thought should be to the epidemiology of representations: I expect the epidemiology of representations, and therefore the causal explanation of cultural facts, on the one hand, and the psychology of thought, on the other, to stand in a relationship of partial interpenetration and mutual relevance. (SPERBER 1985, cited in SPERBER 1996, p. 59)

This stance about levels of analysis implies strong commitments regarding the ontological status of social representations, i.e., regarding reductionism in the traditional sense. SPERBER in this regard is a self-declared materialist without being a reductionist:

Most discussions of the relationships between anthropology and psychology [...] have been in terms of reductionism versus antireductionism. [...] For reductionists cultural facts are psychological facts to be explained in psychological terms; for anti-reductionists, cultural facts belong to an autonomous level of reality, and have to be explained essentially in terms of one another. I believe that neither reductionism nor anti-reductionism make much sense in this case, and that the epidemiological analogy provides a more plausible approach. [...]

What I want to suggest with the epidemiological analogy is that psychology is necessary but not sufficient for the characterization and explanation of cultural phenomena. Cultural phenomena are ecological patterns of psychological phenomena. They do not pertain to an autonomous level of reality, as anti-reductionists would have it; nor do they merely belong to psychology as reductionists would have it. (SPERBER 1985, cited in SPERBER 1996, p. 59–60)

Society in the epidemiological model is to be studied with a dual materialistic attitude (SPERBER 1987, 1997). SPERBER as a social scientist is much more sensitive to the multiplicity of mechanisms involved than DAWKINS. When he introduces the analogy of diseases he already talks of the possibility of distribution patterns of different organizations.

The epidemiological analogy is appropriate in yet another way. The distribution of different diseases – say malaria, lung cancer, and thalassaemia – follows different patterns, and falls under quite different explanations. So, while there is a general

epidemiological approach characterized by specific questions, procedures and tools, there is no such thing as a general theory of epidemiology. Each type of disease calls for an *ad hoc* theory, and though analogies are frequent and suggestive, there is no principled limitation on how much different cases might differ. Similarly, the project of a general theory of culture seems to be misguided. Different cultural phenomena—say funerary rituals, myths, pottery, and color classifications—might well fall under quite different explanatory models. What the epidemiological analogy suggests is a general approach, types of questions to ask, ways of constructing concepts, and a plurality of not too grand theoretical aims. (SPERBER 1985, cited in SPERBER 1996, p. 60–61)

The very idea of transformations at each interaction, and the centrality of the idea of variable transmission patterns is in contrast with the unifying ideas of DAWKINS. A characteristic example for this multitude is the comparison of distribution patterns in traditional and modern societies.

[When I talk about cultural facts in terms of an] *epidemiology of representation*[s. T]here are, to begin with, some superficial similarities. For instance, a representation can be cultural in different ways: some are slowly transmitted over generations; they are what we call traditions, and are comparable to endemics; other representations, typical of modern cultures, spread rapidly throughout a whole population but have a short life span; they are what we call fashions, and are comparable to epidemics. (SPERBER 1985, cited in SPERBER 1996, p. 58)

Detailed epidemiological studies would of course be very much like traditional cultivation and socialization studies in the social sciences. Epidemiological theory would “just” provide another interpretive frame for them. One could see for example, the relation of vertical (parent to child) and horizontal (between peers) transmission and the formation of impersonal agents to transmit relevant knowledge in human societies with different levels of schooling. KATALIN MUND (2002) a Hungarian anthropologist tried for example to show that one could apply the anthropological model distinguishing between small tradition and great tradition according to REDFIELD (1956) to distinguish between epidemiological and memetic transmissions. Basically, from the point of view of the epidemiological theory small traditions (everyday peasant interaction rules, and implicit knowledges of taboos) would correspond to the organismic immune system, while great tradition (formal religions, explicit social procedures) would correspond to viral epidemics. (Think of the case when religions are spreading.) Or, if you take the rivalry of the two models, small traditions would correspond to memetic copying, while great traditions to social innovation through representational epidemics.

Limitations of the Epidemiological Model

The epidemiological analogy as an analogy of course has its serious limitations. They are mainly related to the fact that during the transmission sequence indicated in *Figure 2*, the infiltrating agent, the representation itself changes, while in disease epidemiology the bacterium or virus does not change as a rule, its changes are to be explained. This disanalogy is well seen by SPERBER. "...representations [...] tend to be transformed is time they are transmitted. [...] The replication, or reproduction of a representation, if it ever occurs, is an exception. (SPERBER 1996, p. 58)

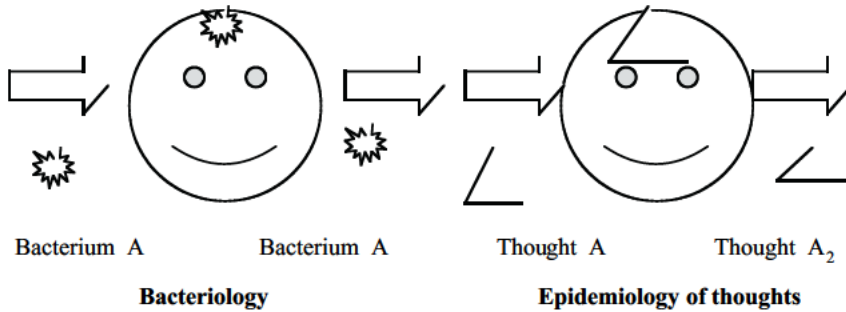


Figure 2. Disanalogy between disease epidemiology and the epidemiology of representations

Here again, general modulating factors show up, not unlike in the case of DAWKINS. Some representations are especially well preserved, and these are the ones that distribute easily in oral societies. The cognitive factors responsible for the preference of certain types of representations – SPERBER specifically alludes to narrative patterns here – are to be found in universal biological features of humans. Thus, in the constant flux of transformations stabilizing attractors have a cognitive-biological foundation.

In an oral culture, human memory filters the contents that are likely to stabilize. This filtering is not just quantitative, it is also qualitative. Thus stories are better remembered than descriptions. Amongst stories, those with a “good form” are better remembered. Among stories with a good form, those involving certain types of characters and of objects are better remembered, and so on. Themes optimal for human memory are rooted in naïve theories which themselves are rooted in genetically determined cognitive dispositions. (SPERBER 1997, p. 134)

On the other hand, some of these constraints and governing factors are of an ecological nature. Education, social status and position have a decisive importance in determining the spread of representations. The little Red Book of Chairman Mao was certainly cognitively easy to absorb, however, in the diffusion of its representations a more decisive role was played by a certain type of human ecology.

A COMPARISON OF THE TWO VIEWS

Though the two views were proposed at about the same time (DAWKINS advanced his meme theory in 1976, and SPERBER had his provocative talk on epidemiologies in 1984) hardly any serious direct comparison exists of the two (for exceptions see AUNGER 2000b; MUND 2002). Their inspirations come from diverging chapters of life sciences – genetics, on the one hand, and the ontology of disease ecologies, on the other – and not surprisingly their internal status and message is different as well. *Table 5* shows a summary of their divergences. In the genetic analogy *repetition*, while in the epidemiological model *transmission* and *transformation* are the key moments.

Table 5. A comparison of meme theory and the epidemiological theory about the diffusion of representations

Aspects	Meme theory	Epidemiology
Emphasis	static	transmission
Variations	replication	modification
Inspiration	genetics	diseases
Explanation	unified	case based
Social science	marginal	pattern based
Goals	reduction	culture theory

A substantial aspect in meme theory is the assumed similarity between genes and memes, focusing on replication. There is a moment of abstraction here, as well, of course that is related to the gene–meme similarity. Memes are virtual entities as well as genes are. The relationship between them and actual behavior is like the one between genotype and phenotype. DAWKINS (1982) might defend, as SPERBER (2001) also clarifies in his critical paper, that in fact it is the instructions in certain cases (like instructions to draw a star) that constitute the genotype, and not copying the actual behavioral output. This is elaborated in the comparisons proposed by WILKINS (1998) and presented in *Table 3*. The abstract relationship opens the way for a more flexible treatment of culture. But if we stay with the analogy, what constitutes the analogy to lineage is unclear in memetic theory: it takes the loose form of “tradition”.

SPERBER himself stresses the differences between the two theories when he shows that the essential aspect of his approach is the centrality of internal factors as opposed to imitation in the memetic theory.

Memeticists have to give empirical evidence to support the claim that, in the micro processes of cultural transmission, elements of culture inherit all or nearly all their relevant properties from other elements of culture that they replicate. If they succeeded in doing so they would have shown that developmental psychologists,

evolutionary psychologists and cognitive anthropologists who argue that acquisition of cultural knowledge and know how is made possible and partly shaped by evolved domain specific competencies are missing a much simpler explanation of cultural learning: imitation does it all (or nearly so)! If, as I believe, this is not even remotely the case, what remains of the memetic programme? The idea of a meme is a theoretically interesting one. It may still have, or suggest, some empirical applications. The Darwinian model of selection is illuminating, and in several ways, for thinking about culture. Imitation, even if not ubiquitous, is of course well worth investigating. The grand project of memetics, on the other hand, is misguided. (SPERBER 2001, p. 170)

What is the Reference of Diffusion Theories?

It is an essential issue for both theories to consider what kind of knowledge they are diffusion theories of. Proponents of memetic theory and epidemiological theory as well usually have in mind explicit propositional knowledge. Culture, however, as it is well known, is not formed only out of these declarative explicit pieces of knowledge, but from modes of behaving and prescriptions to behave in a certain way as well. DAWKINS saw this for himself to begin with: “Examples of memes are tunes, catch-phrases, clothes fashions, ways of making pots or of building arches” (DAWKINS 1976, p. 206). When they are talking about what constitutes a meme, in fact both DAWKINS and SPERBER realize that they have to deal with “instructions” as well, not only with pieces of information. *Table 6* attempts to give a classification of the types of knowledge that might be involved.

Table 6. Types of knowledge concerned in diffusion theories

Type of knowledge	Examples	Memory system	Typical function
Specific knowledge	A tune of Elvis	Episodic store	Recognition
Categorical knowledge	Lemon is sour	Semantic store	Classification, judgment
Procedural skills	Fixing an omelet	Implicit skill store	Modes of action
Prescription	Do not steal!	Explicit rule store	Regulative commands

The first two types of knowledge belong to what is labeled as *explicit* knowledge according to contemporary theories of memory research, while the third one is of an implicit nature (SCHACTER 1996). This distinction might very well entail some constraints on their diffusion as well. Explicit knowledge can very clearly become the object of conscious reflection. Therefore, explicit knowledge can be transmitted through relatively impersonal organized instructional interactions in a horizontal setting (typically in our societies through school instruction), and the individual pieces of knowledge can spread very efficiently through the mass diffusion channels of present day media culture. These are the “ideas” that according to DENNETT (1995, not

without some resonances to POPPER, 1972) make memes into parts of the symbolic world that shape our cultural environment, that create “cranes”. On the contrary, the typical context for the transmission of skill-based knowledge is usually vertical face-to-face interaction. This is of course becoming more complex in present day societies where many of the skills are transmitted horizontally, rather than through intergenerational, vertical means. LALAND, ODLING-SMEE and FELDMAN (2000) showed that there are interesting equilibration phenomena regarding physical adaptation and behavioral adaptation in this respect. Fast behavioral adaptations using niches can slow down the process of genetic adaptation: we build houses rather than growing furs. In a similar way, one could postulate an equilibration process between the role of vertical and horizontal transmissions, depending on the entire symbolic context of a society. As skills do change faster, transmission becomes driven by many more horizontal factors since the knowledge store of previous generations tends to become obsolete soon.

This certainly leaves room for an interestingly articulated transmission process. All of this is not enough, however. Beside explicit knowledge and skills, *preferences* are also transmitted. We not only entertain popular tunes and car brands, but we also harbor preferences attached to them as well.

DAWKINS (1986), when he puns on the possibilities of a general memetics tries to postulate some seemingly quantitative, but in fact qualitative constraints here. Repeated informational pieces under a certain size-limit are not candidates to be memes. Thus, two musical notes cannot be candidates to become memes. We can interpret this as saying that the operating level of memes is that of intentional actions so dear for DENNETT (1987): only those things can become objects of meme level replication that can be intentional objects. Gabora (in press) goes even further: the real cultural replicators are entire systems of ideas that promote each other.

Sperber also points out that repeated behaviors are not necessarily memes either:

Why is laughter not a meme? Because it is not copied. A young child who starts laughing does not replicate the laughters she observes. Rather, there is a biological disposition to laughter that gets activated and fine tuned through encounters with the laughter of others. Similarly, an individual pushed into convulsive laughter by the laughter of others is not imitating them. The motor program for laughing was already fully present in him, and what the laughter of others does is just activate it. (SPERBER 2001, p. 168)

In the epidemiological theory of SPERBER the real open issue is how to fill up the qualitative program with substance. Here again, the crucial issue is how to enter details of society, and relevant social science knowledge. How should one take the point of the analogy which suggests that similar to the fact that “each type of disease calls for an *ad hoc* theory”, one should have a differential epidemiological theory on

different types of cultural knowledge? Any advance here would require a cloze reading of the available mass of social science data if one wishes to make a real integrative theory of social science out of the epidemiological view. Examples taken at random do not suffice. It is not enough to say that fashions are different from science, and the latter one is again different from religion. One needs a thought-epidemiology that would do the job of reverse engineering here: to rephrase the empirical substantive material of social sciences into the framework about the diffusion of representations.

An interesting concrete example is given by BOYER (1994) regarding the epidemiology of religious notions. According to him, religions are “contaminating”, and stabilize easily because they transgress certain aspects of our intuitive ontology about persons (agents), animals, plants, objects, while leaving others intact. A transgression of this kind shows up for example when the constraint for agents to be physical and biological beings is transgressed. In this way we obtain the spiritualized image of God so characteristic for our culture. If personhood can go over to plants and animals, we obtain animistic religions.

Table 7 is an ad hoc attempt to classify modes of diffusion in an epidemiological frame. It is not intended to be exhaustive, nor is it argumentative. I merely intend to show the types that can be differentiated in principle depending on the personal involvement in transmission, the type of knowledge concerned, and the stability of the system.

Table 7. Some characteristic ways of diffusion in contemporary society

Diffusion type	Speed	Time, personal	Time, generation	Typical contexts and domains
Gossip	Fast	Short, few days	Does not get through	Personal interaction, intimacy marker
Fashions	Fast	Short, few years	Long cycles	Media idols and personal authorities
Skills, procedures	Slow, years	Lifelong	Long-term, several generations	Master pupil relations, intimacy and authority
Cultural basic skills (literacy, numeracy, etc.)	Slow	Lifelong	Centuries (print, Internet)	Institutional education: persons and books
Life habits	Slow	Lifelong, irreversible	Changes over decades	Family and peer group
Religion	Slow, centuries	Lifelong, or almost	Longterm, millenia	Personal and institutional
Science	Fast	Skill side slow, data side fast	“Paradigms” for centuries, empiria fast	Critical reference groups, journals, books

It is evident for example, that fashions in the everyday sense show up in all layers of life, and touch upon patterned diffusions that are not under the influence of rational filtering. Many of us do believe at the same time that this is not the whole story. Science creates a universe of discourse where rationality and the specific decision criteria create new secondary filters. Science certainly spreads like fashion, habit,

and the like, but it also has as its basic constituent a decision mechanism taken to be impersonal. This implies that diffusion theories with a biologicistic flavor are also related to the issue whether there is such a thing as disinterested science. Modern science certainly is involved in several competing and additive diffusion networks, that also relates to the traditional issue of how to conceptualize the relationships between science and common sense knowledge.

We are usually satisfied with a division of knowledge not unlike the one proposed by PUTNAM (1975). I know roughly what is genetics or particle physics, and happily leave the rest for the experts. These assumed relations between everyday knowledge and scientific knowledge can easily be different even regarding science. MOSCOVICI (1960), one of the founders of representation research in social science showed in his studies on the representation of psychoanalysis how the structure and content might change due to mass diffusion. These transformations were not random, and could be interpreted according to cognitive-ecological constraints. The crucially interesting aspect, however, is the very fact that changes also involve changes in what constitutes the evidence for the given representation.

A BROADER EVALUATION

Biologically inspired diffusion theories have to face the challenge whether they are mere biological *analogies*, or whether they are meant to be dealing with real explanatory mechanisms. The epidemiological theory is more appealing to me since it not only acknowledges its metaphorical nature, but with its repeated emphasis on cognitive mechanisms it promises to be transformed into a taxonomic model, if not an explanatory one. In order to do this, however, the theory has to be used, at least on the level of case studies. This is still to be seen. This is true of the much more popular memetic theory as well. Many slogans and popular presentations are followed by little actual social science research. Even amongst the sometimes vitriolic critics, however, one should not forget that as RUNCIMAN (1999) pointed out, these diffusion theories navigate in a narrow strait. On one side, they are threatened by the extended pure sociobiological theories, and on the other side by varieties of culturalism that even include providential creationist approaches. Their analogical nature, middle of the road attitude, and questionable heuristic value notwithstanding, they are still serious attempts to combine culture and evolution in a non-trivial, non-reductionist way.

Cultural and biological evolution are many times dissociated as a reaction against nineteenth century evolutionism. A sympathetic summary of this issue is given in *Table 8* from a partisan evolutionary epistemologist. (Incidentally, a similar survey is given by the innovative textbook of BARRETT, DUNBAR and LYCETT 2002).

Table 8. Relationship between organic and cultural evolution
(after WUKETITS 1990, p. 133)

Organic evolution	Cultural evolution
Slow process	Fast process
Goal oriented process, with no intentionality	Goal oriented intentionality
Acquired features not inherited	Acquired features “inherited”
Genetic type of information	Intellectual information
Intraorganic continuity of information processing (cultural transmission)	Extraorganic continuity of information processing (genetic transmission)
Birth of several species	One species many cultures
No borrowing between lineages	Borrowing between lineages

This is the usual portrayal. Diffusion theories, however, tend to see similarities between these two types of replication. WISPÉ and THOMPSON (1976) summarized what kinds of different interpretation were given to the parallels and divergences of biological and social evolution introduced and emphasized by CAMPBELL (1974, 1975). Many have pointed to the speed of cultural change, as opposed to the conservatism of biological evolution, and the Lamarckian nature of cultural change. These interpretations are summarized in *Table 9*. They are presented together with a strong criticism given by HULL (1982), who questioned the simplified contrasts.

Table 9. The emphasis on differences between biological and cultural evolution and their critic by HULL (1982)

Opposition	Biological evolution	Cultural evolution	Hull’s criticism
Category boundaries	Biological: sharp	Fuzzy, mushier categories	Species is a dynamic concept as well
The course of change	Darwinian: selectionist	Lamarckian: instructionist	Instructions in culture not omnipotent
Teleology	No goals	Goal driven processes	Culture has accidental features as well

When HULL (1982) took up this comparison he pointed out that a naïve opposition is based on an oversimplified interpretation of biological processes. It is not true for example that biological categories (species) would be sharply delineated. On the level of concept formation both biological, and cultural, e.g., scientific categories are dynamically changing, “historical” categories. As far as change itself is concerned communities of scientific communications correspond to genetic lineages. Human communities are not fixed, as biological species are not fixed either: they may separate when communications stop in the same way as species bifurcate due to isolation. And what concerns intentionality and goal directedness, both HULL and the diffusion theories are in accord with the views of DENNETT (1987, 1995): we humans freely apply the intentional stance, but this should not create the illusion that teleolo-

gy would be valid in the outside world as well. As DENNETT (1990) in a paper with a provocative title pointed out, there is no principled difference in the human treatment of evolution, interpretation of each other as intentional agents, and the interpretation of cultural objects, like literary works, and other human artifacts. Regarding all of these, one can take the intentional stance, but we should not take this too substantially, rather merely as an interpretive strategy. Thus, in this regard there is no difference between biology and culture.

BARRETT, DUNBAR and LYCETT (2002) showed in their textbook that even the identical versus loose reproduction as an opposition between biology and culture is rather questionable. *Table 10* shows their comparison of “heritabilities” in biological and cultural traits. Interestingly enough, some of the cultural traits show as much correlation within human populations as biological traits. That is a strong argument for horizontal memetic transmission, or “imitation” to be as strong as biology in determining our outlook. As the authors themselves say “Cultural transmission, it seems, is both reliable and surprisingly robust by comparison with genetically transmitted traits” (BARRETT, DUNBAR and LYCETT 2002, p. 356).

Table 10. “Heritabilities” of cultural and biological traits
(after BARRETT, DUNBAR and LYCETT 2002)

Cultural transmission		Biological transmission		
Trait	Parent offspring correlation	Trait	Parent offspring correlation	Heritability
Religion	0.71	Stature	0.51	0.86
Politics	0.61	IQ	0.49	
Beliefs	0.49	Mascul/feminity		0.82
Entertainment	0.44	Span of hand	0.45	
Habits	0.24	Forearm length	0.42	0.84
Sports	0.22	Hip		0.43

In their own ways, both DAWKINS and SPERBER represent a variety of biology–culture continuity theories. They suggest that in any complex hierarchical system there are typical mechanisms not only for vertical integration of functions and information, but horizontal mechanisms for information integration as well (this latter would correspond to the diffusion of representations), and similar scientific principles should be used for their analysis on any level. This optimism is the enlightenment aspect of these theories. In one respect, however, they present a rather pessimistic vision. Both theories basically underline the repetitive nature of human thinking. One needs to have some similarly general theories to cover the innovative aspects of human thought. The theory proposed by BARTLETT (1958) regarding the essential aspect of boundary crossing in human creativity is one of these, as well as BÉLA

JULESZ (1996) with his emphasis on scientific bilingualism. One can only hope that the two theories analyzed here belong to this fertile class of ideas when they try to combine biological imagination with the humanities.

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