

Making Memetics a science

Measuring diffusion and adaptation of memes in social systems

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Abstract: In nature- and social sciences specialization divides both focus and research methods. Findings within the different research disciplines are often incompatible due to this. This paper suggests a possible method crossing different research disciplines and social systems. The methodology can be applied in studying determinates of human action and interaction. Determinates are in the paper defined as memes, and manifested as signs and objects. Memes influence and form individual and collective systems and circulate successfully within them. The paper suggests a cross-scientific approach, as a methodically improved version of memetics, avoiding the over-generalization trap.

Every science has its own ontology, epistemology and consequently its own methodologies.

Ontology defines the fundamental categories of reality. *Domain ontology* as distinct from *formal ontology* is related to focus of study. Each research field has its own ontology. A biologist, who studies ants, differentiates the ants' specific constituent parts, actions and contexts. Similarly a sociologist will have implicit and/or explicit presuppositions about categories of reality that are fundamental and related in the human and social systems she/he studies. Where formal ontology inquiry is to say *something general about reality*, domain ontology says *something specific about different areas of reality*.

Epistemology defines how we can know and reason that reality. As for domain ontology, each research field has its own epistemology: The maps applied by the biologist studying ants, are traditionally different from the maps applied by the sociologist in her/his studies of interacting humans.

The methodologies of each of these two scientists have followed as different systems of investigative techniques within their focus of study. The biologist and the sociologist traditionally apply different procedures for accomplishing and approaching

the phenomena they focus on. They use different scientific methods studying different domains with different epistemology and ontology.

In our ever-closer connected and interdependent world, where parts in nature and society increasingly influence each other, it is legitimate to ask for an aggregated cross-scientific methodology that can be applied both on human thoughts, communication, decision, action and interaction, and hence become a new overall epistemology. Despite the traditional division, it should be possible to say something general about our fundamental categories of reality crossing the different sciences. Is there an overall cross-scientific way to reason and make sense of and broaden our perspective of what determine human action and interaction? Is there a best technique for inquiry, that integrates the traditional divisions, but still discover and examine facts without going into the over-generalization trap?

Through history there has been an evolution in ontology, epistemology and methodology. Francis Bacon made his crucial experiments in nature science, and Max Weber made his methodological division between interpretation, understanding and explanation in social science. John Locke's and David Hume's Empirism, Auguste

Comte's Positivism and the Pragmatism of Charles Pierce, George Herbert Mead and John Dewey are contributions among many others of different approaches to the philosophy of science.

A scientific approach presupposing that facts are out there, just waiting to be discovered, are very often combined with another presupposition; that we can perceive the world as neutral signs and interpret the signs in relation to these facts. If we thirdly trust claims about facts, rather than investigating the facts ourselves, we are placed in the solid scientific tradition that founded modernity and developed positivism.

Following modernity in the development of social sciences there has been two main paths; the first stating human action and interaction is solely explained through the epistemology of positivistic science; cumulating true knowledge through verification and falsification of objective facts. The second and younger position states social science should be measured by *different scientific standards* based on progression and ability to explain from multiple positions. This rather than have one idealized and deterministic explanation based on rigid, but in practice impossible attempts of isolating social variables. There are many ways to Rome, which is good according to the later, and different paradigms produce different scientific results. Different epistemology leads to different methodologies that enrich our understanding of the fundamental categories in our world.

If we combine this later post-positivistic work with contributions from pragmatism, we can go further: Pierce famous formulation summarizes an essence in the philosophy:

A sign is anything that stands for something in somebody's mind. This "something" is called the sign's object; the "somebody" is called its interpretant.

Reality can be divided into several parts not only by domain, but also as we perceive it:

The reality out there, *presented as signs*; can be defined as "reality a". When "reality a" *hits the interpreters neurological receptors* (see, hear, feel, smell, taste), it becomes parts and wholes of a "reality b". When the interpreter *makes sense and become conscious* of these parts and wholes of "reality b", it becomes "reality c". When "reality c" is *given code as objects* in the interpreters mind, it becomes "reality d", and finally when "reality d" is *communicated as coded objects* it becomes "reality e", which again can be "new reality" for new interpreters out there.

All individual perception can be regarded as partial; we will always lose parts of reality in our individual and collective journeys and loops in "reality a - e".

The conscious or subconscious selection of "reality a - e" is based on influence from the ones we relate to in society. We are cultivated in such a way that we delete signs from "reality b" to "reality d". What we regard as relevant for selection is a function of our cultural transmitted identity, beliefs, values and knowledge. Our selection is led by our evolutionary need for biological and social survival and reproduction and of our neurological capabilities. We pick and choose based on what reinforce our sustainability as individuals and collectives in our biological and social contexts.

Another complementary post-positivist way to approach perception, thought, communication and social action is *Memetics*. Memetics is derived from natural science and genetics, and uses the same research programme studying social diffusion and adaptation of sign/objects and actions.

Memes are sustainable information units manifested as signs and/or objects (along reality a-e)¹. Memes can be regarded

¹ In Greek mythology, Mneme was one of the three original (Boeotian) Muses, though there were later nine. Her sisters were Aoide and Melete. She was the muse of memory.

The evolutionary biologist Richard Semon wrote in 1904 "*Die Mneme*" – a book about memory where the meme was defined as "units for cultural transmission of experiences".

as *knowledge-elements* that influence and form individual and collective systems and spread successfully within them. Memes are naturally selected and adapted by human beings based on competition of our consciousness. The fittest and best-adapted memes will have a better diffusion than the ones who do not fit into the cultural systems they are competing.

According to a memetic approach, each one of us hosts thousands of memes. “Coca-Cola”, “Jesus”, “Kilroy”, “Taco”, “Orange”, “The smell of roses”, “Beethoven no. 5” and “Sex” are all some examples of memes out there. What kind of memes we carry is a function of the cultural systems we are a part of. As mentioned above we sense and interpret these memes according to “reality a-e”

Based on the relationship between ontology, epistemology and methodology, a memetic formal ontological statement and definition of the world will be: Reality is memes. An epistemological question that follows will then be: How do memetics make sense of memes? And consequently the methodological inquiry is: What investigating technique and procedures can be applied in memetics for approaching memes?

Two positions are most eloquent approaching these questions. On one side we have the *externalists* stating that memes are observable artifacts and behavior. Outside the occurrence of the event, the practice of behavior or life of the artifact, the meme have no existence (Gatherer, 1999). Memes are out here in the physical “pool” of the environment (Benzon, 1996).

On the other side the *internalists* states that memes are manifested in the cognitive brain. A meme is an information pattern, held in an individuals’ memory, which is capable of being copied to another individual’s memory (Heylighen, 1998). The meme is a memory item, or portion of an

organism’s neurally stored information, identified using the abstraction system of the observer, whose instantiation depended critically on causation by prior instantiation of the same memory item in one or more organism’s nervous system (Lynch, 1998).

Based on these different positions and arguments on how to grasp memes, we do also have contributors in the field that put forward that no one actually knows what a meme is (Augner, 2002).

Memetics has in some academic circles been regarded as an obscure philosophy and not a renowned science. This might be the case due to the lack of progression and growth in the field the latest years, philosophically, scientifically and in terms of empirical research. Memetics is regarded as a weak metaphor of the strong scientific discipline *genetics*; a metaphor that breaks down in its attempt of transitioning from nature science to social science.

Based on the above I will in the following come up with a suggestion how to revitalize memetics and establish it as a renowned cross-scientific discipline.

In the 1960’s and 1970’s when Karl Popper and Thomas Kuhn was heavily influencing the academic discourse in all sciences, there was one man trying to synthesis Popper’s strong falsifications and Kuhn’s paradigmatic approach, by introducing the term *Research Programme*. The Hungarian philosopher Imre Lakatos at London School of Economics defined a research programme as scientific contributions circling around and epistemological and ontological *hard core*. This hard core can be regarded as equivalent to an academic attractor where different contributions in a field revolve. Each of the traditional research disciplines in nature-, social- and human sciences has these academic attractors with its reinforcing scientists that oppose their perspectives to other scientists circling other hard cores within other sciences.

Lakatos suggests that instead of working with sole verification or falsifications of hypothesis, or total neglect of one paradigm to another, we should ask whether one research programme is better than an-

Nobel Prize winner Maurice Maeterlinck wrote in 1927 “*The Life of the White Ant*” where he mentioned “... engrammata upon the individual mneme”.

A engrammata is a memory trace.

other depending on the purpose of the research. *Problem shifts* within a research programme makes it sustainable without changing the paradigm. A problem shift is changes of the auxiliary hypotheses within research programme for explaining obvious contradictions on one side and for creating novelty and new insights on the other.

A degenerative research programme is recognized through lack of growth both theoretically and empirically. Instead proponents produce a protective belt of auxiliary hypotheses that does not lead to novel facts. A progressive research programme on the other hand experience growth, discovery of stunning novel facts, development of new methods and more precise predictions.

According to the criteria above one can argue that memetics today is a degenerative research programme. Memetics ambition being a formal ontology, hence with a “catch all” epistemology, but without a well proved methodology for empirical research has created lack of growth.

As Daniel Dennett proclaimed in his book *The Electric Meme* in 2002, “No one know what a meme is”. The ontological units of analysis are missing. It can be argued that the either/or discussion between externalists and internalists is hypothetical and counter productive for bringing memetics forward. In addition the term “meme” is never operationally defined so it can be applied in empirical research. If you do not know what you are looking for, you cannot find it.

There have however been previous calls for action addressing related concerns about memetics. Edmonds (2002) among others argues that the theoretical statements of memetics are too vague to be empirically tested. Gil-White (2002) express that memetics suffers from conceptual confusion and not enough empirical work. Auger (2000) suggest urgently that memetics should follow the progress of evolutionary cultural studies more generally, as in anthropology. The clock is ticking for memetics.

The answers to these and other calls differ. Chielens & Heylighen (2005) introduce four ways memes adapt and four stages for memetic replication. They underline the importance of a “suitable memetic unit” for memetics to be tested empirically. Examples of such unit can, according to them, be storylines; the different elements of stories can be seen as individual memes, or digital virus hoaxes like email messages warning for non-existing viruses.

Dennett (2002) waits and hopes that the neuroscience will be able to measure the electric difference between the different memes when fired as diverse impulses between the synapses in the brain. When you think of the meme “taco” or “killroy was here” different electric impulses that can be distinct and determined, and by that be differentiated, defined and measured.

Hull (2001) means we should postpone definitional concerns in memetics, and start empirical research by developing different memetic theories influenced by the domains they are tested. He further argues that it is crucial to make distinctions between memes on one side and the detectable outward manifestations of specific memes on the other. The observable attributes a meme create are what should be investigated (the phenotype). Hull is also an exponent of having a clear goal every time memetic research is conducted.

The intentions behind all these calls and answers for strengthening memetics are good and necessary. The suggestions put forward grasps, from different angles, aspects that needs to be in place to renovate memetics.

In the following I will put forward three essentials, additional to the ones above, in an attempt of making memetics a science and develop the discipline as a progressive research programme.

Firstly it is necessary to define clear distinctive domain ontology with mutual exclusive memes in each memetic research project.

Secondly it is crucial to develop a more sustainable memetic epistemology, a scientific attractor where different memetic

research can revolve despite their theoretical and empirical differences. And thirdly it is vital to define a clear memetic methodological framework with distinct criterion for validity and reliability.

Memetics epistemology should make sense of diffusion and adaption of ontologically predefined memes and their influence on individual and collective states and actions. Each empirical researcher should make ontological predefinitions of memes every time she/he goes into a new empirical field. In other words the units of analysis need to be defined. The researcher should obviously define what she/he is looking for. Memetics epistemology should furthermore make sense of the correlation between individual and collective thoughts, communications, decisions and actions. There is also a need for an integrative definition of memes that repeal the front between the externalists and internalists. Memes can be regarded as *forms and cognitive templates* that process subjective thoughts, communications, decisions and actions along reality a-e.

A distinctive investigating technique can be developed based on previous work (i.e. Chielens&Heylighen, 2005). These works should be enriched with stronger requirements of predefined meme ontology in research projects as argued above.

One can say that all these suggestions brings memetics back to methodological reductionism where it does not belong. I argue that methodological reductionism and epistemological holism can be unified. In order to be analyzed, both physical and metaphysical units of analysis need to be predefined. Implicit in defining the units of analysis lies a reductionism. To find the units systemic interaction with its social system is the core of a new memetic research programme. The axiomatic presupposition that memes influence the complex wholes they are become a part of, is a holistic and systemic perspective.

To further strengthen memetics it should be open and still enriched with perspectives from other progressive research programmes. I will here go into four of

many sources that can vitalize memetics. These four are complex systems theory, evolution theory, pragmatism and distributed cognition.

Complex systems theory is a relatively new scientific school based on other philosophic foundations than reductionist theory. Different from the Cartesian tradition emphasizing study of each part in a system, parts of a whole are always perceived together.

Instead of studying isolated cause-effect mechanisms, the object of study is patterns (simple and complex) and mutual dependency within systems and sub-systems.

Every social system consists of individuals and groups of individuals. These groups and individuals are agents that produce effects. Agents often have separate strategies to achieve goals. Emergent, intended and not intended, effects are made in the system when these separate strategies are brought into action within the same time-frames.

The social system is complex when there are strong interaction and interdependence between the different agents actions and the effects they make. Current actions and effects have strong impact on probable later actions and effects. Due to this, it is often delay related to the agent's expectations of cause and effect. These agents thoughts, communication, decision and actions are, according to a memetics approach, a functions of the memes they carry. The system evolves as a function of these dynamics.

Central concepts in *evolution theory* are selection, adaptation and diffusion. Most people link evolution with development in biological systems. Evolution theory, however, has also been applied within social systems, and recognized as having great power of explanation in broader circles of the academic society.

Only those ideas, means of communication, decisions and actions (memes) with the greatest sustainability within a social system will be accepted and survive. In social systems choice is made consciously or

unconsciously of what are acceptable thoughts, means of communication and actions. Individuals who mutually affect each other undertake the choices. One can attempt to lead the choices through both formal and informal input of memes into the predefined social system.

Those ideas, communication forms and actions that prove to have the most sustainability in a specific social system will spread within this system. Great sustainability and strength will also contribute to spreading into other systems. The systems choose pragmatically based on the sum of the agent's dispositions.

Pragmatism emphasizes that ideas and concepts (memes) will have to be empirically testable in order to have relevance and importance.

Ideas without practical, concrete consequences are worthless. Only when ideas are linked to experience do they become true and relevant.

Within pragmatism thoughts are tools for action. Knowledge thus consists of models that represent reality in a way that maximizes simple problem solving. No model will ever be able to represent reality with all its relevant information. Several, often contradicting, models will therefore be applied simultaneously in spite of involving paradoxes if taken together.

The choice of a model is a function of the goal one wishes to reach or the problem one wishes to solve. The models that are applied to a problem will have to be experienced as subjectively relevant in order to produce solutions in a simple way. Alternative use of theoretical models will be without value in a pragmatic perspective and remove us from our reality instead of bringing us closer.

Distributed cognition is an interdisciplinary study of mind and sense making that contribute a lot of new models and insights that refine the contributions from the other three. It views a system as a set of representations, and models the interchange of information between these representations (memes). These representations can be either in the mental space of the participants

or external representations available in the environment.

Distributed cognition combines different perspectives within philosophy, education, psychology, neuroscience, linguistics and anthropology. Distributed cognition deals with attention, language, learning and development, memory, perception and action (both externalist and internalist).

Cognitive processes are distributed across members of social groups; cognitive processes are distributed in the sense that the operation of the cognitive system involves coordination between internal and external (material or environmental) structures. According to distributed cognition, processes may be distributed through time in such a way that the products of earlier events can transform the nature of later events as in complex system theory.

All four perspectives above will in combination influence choices related to diffusion and adaption of ontologically predefined memes. Both complex systems theory, evolution theory and partly pragmatism are main inspirations for the development of memetics so far. Still, as stated in this paper, memetics has to be further strengthened with perspectives from these three universal perspectives. In addition memetics need to look around and be open to impulses from co-developed sciences from the same main sources. One example mentioned here is distributed cognition.

Making memetics a science with a clearly defined ontology, epistemology and methodology require openness to other progressive research programmes; still trusting that memetics has something unique to contribute to the theoretical and practical world in its development toward a renewed scientific discipline.

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