

Information: Evolution, Psychology, and Politics

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ABSTRACT

Social representations theory is unique within social psychology for its primary focus on information and its effects on society. Schema research likewise focuses on information, but only information in individual minds. Meme theory, while essentially a redescription of what we already know, provides a helpful perspective on how ideas form, change, and spread. Together, these three approaches to information can help inform a political psychology capable of addressing the most pressing political problems we face today.

Keywords: Information, social representations, schemas, memes, evolution

Information has been evolving on earth for billions of years. While the naïve view of information is of something ethereal, formless, weightless, *immaterial* and the rest, in fact information never exists outside of some form of physical substrate. Information can exist in patterns of ink on paper, sound waves, electrical pulses, neuronal connections, or notches on a stick. One theory of quantum physics even proposes that the most fundamental physical unit making up our universe is information (Masanes, Müller, Augusiak, & Pérez-García, 2013). At a physical level, information is the inverse of entropy or uncertainty. The more information we have about a physical system, the

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less entropy there is; and the more uncertainty a message reduces, the greater its information content (Pierce, 1980, p. 23). For the majority of earth's history, the only form of information to have evolved is genetic: this information has been in the form of molecular organization, DNA and RNA. Over billions of years, this information has increased in amount and complexity through a simple process, the evolutionary algorithm: a mixture of variation, replication, and selection. Its three components are instantiated in the case of biology by self-replicating molecules, which change and vary due to processes like random mutation, and are selected by their differential survival. At their very core, DNA molecules are information, instructions for making proteins – and in the aggregate, they code for the development of everything from viruses to blue whales, our bodies and minds (Smith, 2000).¹

While the popular understanding of the evolutionary algorithm is usually traced back to Darwin's publication of *On the Origin of Species* in 1859, evolutionary approaches to information began nearly a century earlier with attempts to search for the origin and “common descent” of languages (Heylighen & Chielens, 2008). Six years before biological evolution (or the evolution of biological information) was introduced by Darwin, German linguist August Schleicher published tree diagrams of languages in an attempt to recreate a common ancestor of languages. The early psychologist William James pointed out that a “remarkable parallel, which I think has never been noticed, obtains between the facts of social evolution on the one hand, and of zoological evolution as expounded by Mr. Darwin on the other” (as cited in McGranahan, 2011, p. 80).

Before the 20th century, the concept of “gene” did not exist; Darwin referred to “gemmules” as a theoretical unit of biological information that is inherited. Likewise, in the realm of social evolution, there was no commonly-accepted theoretical unit of information. Early anthropologists broke down aspects of culture into various sorts of units and studied their spread and evolution: Edward Burnett Tylor called them “institutions” and “customs”; Franz Boas called them “elements” and “traits of culture”, and the empirical manifestations of such units “incidents”; the German diffusionists referred to “trait complexes”, and conceived of traits as general ideas rather than specific empirical units; and A.L. Kroeber studied the diffusion and origin of “culture traits” (Lyman & O'Brien, 2003).

The analysis of social evolution took a mistaken and harmful detour through the Social

¹ See, for instance, Griffiths (2001) for a discussion of the controversy on the use of information theory in biology. His “parity thesis” sensibly proposes that evolutionarily-relevant information subsists not only in DNA, but in organisms' environments as well.

Darwinism of Herbert Spencer, and particularly his followers. Instead of viewing social evolution as the joint product of biological evolution and the evolution of information in society (“culture”, in the aggregate), Social Darwinism viewed social evolution as merely the product of biological evolution writ large. The only evolutionary dynamic it acknowledged was that guiding human biology. Ironically, it was Social Darwinism’s blindness to the importance of the evolution of cultural information as opposed to biological evolution – and, of course, its ignorance of how environmental influences affect physiological and psychological development – that was to eventually doom the project. But before Social Darwinism became largely extinct, it spread virulently in the social environment of the United States in the 1880s and ‘90s, receptive as it was to justifications for competition, individualism, territorial expansion, and plutocracy (Runciman, 2009, p. 18).

A cogent, contemporary criticism of Social Darwinists was offered by Gabriel Tarde, possibly the first precursor of the modern memetic view of cultural evolution (Marsden, 2000). He criticized as unjustifiable their conflation of biological and cultural evolution in their use of the term heredity: “They use this word indifferently to express the transmission of vital characteristics through reproduction and the transmission of ideas and customs, of social things, by ancestral tradition, by domestic education, and by custom-imitation” (Tarde, 1903, p. xv). In Tarde’s view, like those today who study gene-culture coevolution, the evolution of biology and culture are separate and complementary.

Tarde’s revolutionary perspective was to propose ideas themselves as the principle actors in social phenomena. Ideas spread through society through imitation and counter-imitation, and they are combined in novel mixtures to produce inventions, which are themselves imitated or copied. Ideas can be adopted either through “substitution” or a choice between two alternatives (similar to a gene and its allele), or through “accumulation” or a logical union of two ideas; and an idea’s success in spreading is determined by the compatibility of that idea with the current environment of other ideas (Marsden, 2000). Tarde even defined “reason” itself as a specific desire for coherence between accepted ideas (Tarde, 1903, p. 149). That is, what a given society considers reasonable – a selection mechanism – is merely that which does not contradict the commonly-held ideas in that society.

This article is an abridged version of a chapter in an upcoming book, and will propose a way of incorporating approaches to cultural evolution into social representations research, primarily

through meme theory, with schema theory acting as a bridge. (For more on the links between schema theory and social representations, see Augoustinos & Innes, 1990, and Vala, 1993). It will first introduce the concept of the “meme”, its origin, development, the main criticisms leveled against it, a response to those criticisms, and an explanation of how meme theory is useful. Next, it will examine the differences and similarities between memes and social representations, and suggest a way to incorporate the two. Finally, it will discuss how the incorporated insights and methodologies of meme, schema, and social representations theories can provide the foundation for a political psychology that can satisfyingly investigate the most urgent problems of contemporary politics.

MEMES AND EVOLUTION

To understand the meme as a theoretical construct, we have to go back to the context in which it was introduced: in 1976 with Richard Dawkin’s *The Selfish Gene*, a popularization of the theory that evolution acts only on the genetic (as opposed to the organismic or group) level. The book tells an amazing creation tale, one that surely rivals the creation myths of religion. It starts billions of years ago, when all of the matter in the universe was condensed in a small space of unimaginable density and temperature. (Imagine the whole planet condensed into a grain of sand, and hotter than the sun.) Then, nearly 14 billion years ago, this mass of condensed, supercharged matter exploded, expanding into space. As this matter rushed out at incredible speeds into space, it aggregated into planets and stars, attracted together by gravity into solar systems like ours. On our planet, atoms were constantly being attracted to each other in different combinations, forming molecules. By the laws of physical attraction and repulsion, and with sudden influxes of concentrated energy in the form of volcanic eruptions and lightning, some of these combinations of atoms happened to make copies of themselves from the atomic and molecular matter bouncing into each other on a planet devoid of life. All it took was for one molecule or chain of molecules to arise that had the property of attracting bits and pieces of atomic material, which would then be formed into a replica of the original molecule: this was the first replicator. From this inauspicious beginning came all of the products of biological evolution: great sequoias, dinosaurs, mushrooms, birds, whales, humans, and all the rest.

How a nonliving, self-replicating molecule with less complexity than a virus came to create

the staggering diversity of the biological world is an illustration of the power of the evolutionary algorithm. The evolutionary algorithm is the differential survival of imperfectly replicating entities displaying fidelity, fecundity, and longevity – and the algorithm itself is substrate-neutral, meaning that it can obtain in a variety of different domains (Dennett, 1995). In the biological domain, to return to our creation tale, the self-replicating molecular ancestors of DNA displayed fidelity (they would make accurate copies of themselves most of the time), fecundity (they would make several copies of themselves, given the right raw material or molecular “food” in the environment), and longevity (they would usually survive long enough to make copies of themselves). At other times, these molecules would make imperfect copies of themselves, introducing variation. This is the “differential survival” part of the algorithm: some self-replicating molecules of different forms tended to make more copies of themselves than others. Some of these molecules may have been composed of more readily-available atomic matter in their environment, and so could make more copies of themselves; others may have grown larger and more stable, allowing them to stay together for longer, making more copies of themselves over a longer period. Whatever the actual case may have been, at some point these self-replicating molecules evolved to build structures around themselves out of the available atomic material. The cell was born. Now, instead of self-replicating molecules freely flowing through the earth’s oceans, accumulating atomic material out of which to make copies of themselves, there were self-replicating cells swimming about, carrying inside them the descendants of the first self-replicating molecules. Single-celled organisms evolved into many-celled organisms, and multicellular organisms eventually evolved into the animals and plants of today.

Rather than the evolutionary algorithm itself, the starring role in *The Selfish Gene* was given to the anti-hero pilot of massive biological robots, the gene. Hence, when Dawkins introduced the “meme” concept later in the book, it was straightforward for readers to consider it a mere analogue of the gene; and to consider the worth of the meme concept to hinge on the closeness of the gene-meme analogy. But as Susan Blackmore (1998) described the most basic principle of meme theory: “genes and memes are both replicators but otherwise they are different” (p. 66). Memetic evolution, while analogous at a deep level to genetic evolution, is much more complex (Heylighen & Chielens, 2008).

A meme is the theoretical basic unit² of informational/cultural evolution: it is that

² Moscovici (1988) on the use of theoretical entities for scientific explanation:

information which is subject to the evolutionary algorithm, and selected in a cultural environment. The meme is a dizzyingly broad concept. It can encompass everything from a peculiar noise to a software virus; from a chair, to your idea of a chair, to instructions for making a chair; from a joke, to a story, to an entire ideology. However, for particularly large chunks of information like ideologies, legal arguments, and religions, the term “memplex” is used; it denotes a collection of self-reinforcing memes that tend to replicate together (Heylighen & Chielens, 2008).

As a phenomenon for empirical investigation, the staggering breadth of the meme concept threatens to make it useless; as Serge Moscovici (2001) warned about Durkheim’s collective representations, “by attempting to include too much, one grasps little: grasp all, lose all” (p.30). However, for empirical investigations of memes, Pocklington and Best’s (1997) definition may avoid the problem of overbreadth:

The appropriate units of selection will be *the largest units of socially transmitted information that reliably and repeatedly withstand transmission*. ... The two important characteristics of this definition are that a unit be large enough to exhibit properties that may covary with replication success and still be small enough to have robustly developing characteristics that reappear from host to host. (p. 81)

For empirical investigation, it may be necessary to restrict the scope of the meme to informational chunks small enough to reliably and repeatedly withstand transmission.

CRITICISM OF MEME THEORY

Generally speaking, explanatory concepts are likely to be abstract and ill-defined, as was true of the gravitational force in mechanics, the atom in physics, the gene in biology and social classes in Marxism. Their existence was assumed to be proven and then many things were explained by their intervention, although they themselves remained as obscure as ever. Let us say that they were figments of thought rather than real entities, to use a rather antiquated phrase. It was known what each of them *did*, and nobody cared what each of them *was*. But once something is conceived and endowed with an explanatory power, one must try to advance further and grasp the reality of the force or the phenomenon in question. Progress can be made no other way. (p. 223)

Critiques of meme theory have often focused on the weakness of the gene-meme analogy (Claidière, & André, 2012; Kronfeldner, 2011; Kuper, 2000). This is certainly a problem to the extent to which meme theory relies on analogy. But regardless of the strength of the gene-meme analogy, it is important to recognize that it is not a defining characteristic of the memetic perspective or theorizing about cultural evolution in general. What is important is that information evolves and spreads, because it is subject to the evolutionary algorithm. As Garry Runciman (2005) argues:

Information is not a metaphorical term needing to be cashed into something else. It is the reality. Although much of the language of science is metaphorical and none the worse for it, there is no other thing for which theorists of cultural selection are using the concept of information transfer to stand proxy. (p. 4)

Another example is that the evolutionary algorithm has been applied to computer programs, and has produced remarkable results (Aunger, 2002; Jamshidi, 2003). Prions and computer viruses are other examples of evolving replicators (Aunger, 2002, pp. 94-113). These provide an illustration of the substrate-neutrality of the evolutionary algorithm: it works for genes, memes, prions, computer software and viruses, and anywhere else that can “run” the algorithm. Today, it seems ironic that one of the most cogent original criticisms of the meme concept was that, unlike genes, memes are insufficiently discrete and separable to be subject to the evolutionary algorithm. Yet developments in genetics over the intervening years have begun to make the gene seem nearly as much a fuzzy, hard-to-isolate entity (Blute, 2010, p. 115-20). According to bioinformaticians Sonja Prohaska and Peter Stadler (2008), “the classical molecular concept of a gene as a contiguous stretch of DNA encoding a functional product is inconsistent with the complexity and diversity of genomic organization” (p. 215). Another criticism of the meme concept focused on a different aspect of discontinuity in the gene-meme analogy: the ability of memes to change before being passed on, making them, in a sense, Lamarckian evolutionary entities. Today, evidence of an ability of organisms to change their own DNA during their lifetimes has inspired a heated debate in genetics, with bacterial geneticist James Shapiro (2011) arguing that “[t]he capacity of living organisms to alter their own heredity is undeniable” (p. 2), and that the very use of the term “gene’ gives the false impression of specifying a definite entity when, in fact, it can mean any number of different genomic components” (p. 29). So much for the gene-meme analogy being inapposite. A

more useful critique focuses on transmission mechanisms, and the issue of imitation.³

Here, as Dan Sperber (2000) points out, it is important to remember that a simple form of imitation is not how information is normally transmitted from person to person. Information transfer is mediated by attributing intentions, making inferences, linguistic rules, evolved dispositions, and other processes that decode and reconstruct incoming messages with greater or lesser success. And at the neuronal level, even cultural attributes cause different patterns of brain activity when making the simplest of perceptual judgments (Hedden, Ketay, Aron, Markus, & Gabrieli, 2008). Then is the copying fidelity of information from person to person is too low to support the evolutionary algorithm? The history of cultural artifacts, for one, suggests otherwise. Archaeologist Stephen Shennan (2002) points out that “even though there may be all sorts of things going on in the mind, the resemblance between the inputs and the outputs is often very striking, as the example of the continuity in many prehistoric pottery traditions clearly demonstrates” (p. 47). Certainly there are many instances in which accurate replication of information from mind to mind is highly problematic – communicating opinions and feelings, for example – but a great deal of culturally and politically relevant information is transmitted with “striking” fidelity, regardless of the fact that there are “all sorts of things going on in the mind”.

To avoid the problematic nature of imitation and how it should be defined in interpersonal communication, Robert Aunger (2002) suggests the meme be redefined as “the state of a node in a neuronal network capable of generating a copy of itself in either the same or a different neuronal network” (p.325), or “a configuration in one node of a neuronal network that is able to induce the replication of its state in other nodes” (p.197). Viewing memes as nodes in a neuronal network helps reveal that even if there are random copying errors or information loss during interpersonal communication, the central tendency of the copies will still float around the original meme. Therefore on a population level, the original or normative meme will be dominant, and copying fidelity is high enough for evolution to occur (Aunger, 2002, p. 249).

A review of current neuroscientific research by Kiefer and Pulvermüller (2012) both supports and complicates this view. There is some evidence of individual concepts being encoded by individual neurons – the localist, “grandmother” or “Halle Berry” cell theory, with one cell coding

³ The argument this critique has generated is quite similar to the 1903 debate between Tarde and Durkheim, in which Durkheim attacked and Tarde defended the latter’s view of imitation as a transmission mechanism (Vargas et al., 2008).

one concept – but the evidence is inconclusive. Better supported is that individual concepts are encoded in representations distributed through a neural network. Concepts are grounded in perception and action, and their storage is distributed across sensory and motor areas of the brain – meaning that our representation of concepts depends at a most fundamental level on our own idiosyncratic experiences. Most interestingly, even abstract concepts seem to be stored in neural networks that include memory traces from our own experiences: “Complementing sensory-motor representations, abstract concepts such as ‘to free’, but also ‘truth’ and ‘relationship’ are typically strongly associated with emotions and may also include introspective information about internal states experienced in corresponding situations (e.g., in a situation, in which an individual felt freed in the past)” (Kiefer & Pulvermüller, 2012, p. 820). Thus it seems that at a fundamental, neuronal level, information certainly does get copied more or less accurately from individual to individual (close enough for jazz, or for evolution to occur at the population level). But that information may feel entirely different from person to person, depending on their memories of experiences that are tied into the very neuronal encoding of that information.

Regardless of inter-individual differences in the storing of information, developments in our understanding of “mirror neurons” have supported the memetic view that information evolves and spreads on a neuronal level through imitation (McNamara, 2011). Although mutations are far more common in memetic evolution than in biological evolution, this does not make memes or cultural information an impossible candidate for the evolutionary algorithm (Cardoso & Atwell, 2011).

Clarifying the “meme’s eye view”

What is most important about the meme concept is not that it represents a radically new scientific theory with testable predictions and surprising results. It is not: memetics as a research paradigm, with its own unique methodologies, has not yet achieved any great success (Aunger, 2006; Edmonds, 2005). Still less is it important as a term of art in the advertising industry, or as a catchall term for widely-viewed jokes, videos, and cat pictures on the internet. Instead, the memetic perspective is valuable as just that: a *perspective*. It replaces what at times is our implicit, unexamined view of our own knowledge: it feels as though we have actively sought out the best, most accurate ideas and beliefs from those available. It is as if we stood atop a sort of intellectual Mount Olympus, with all ideas, beliefs, ideologies, etc. within our view, and then we choose among them according to our own

(impeccable) taste and judgment. In contrast, the memetic perspective is both explicit and humbling, reminding us that our beliefs and knowledge are contingent upon the information we have been taught, indoctrinated with, or learned on our own – at the very least, the information we *have been exposed to* – and that there is no guarantee that the information we have absorbed has any close correspondence with the reality it purports to describe. This view cuts through needless obfuscation and intellectual anachronisms to get at the key constituent of culture, politics, and social organization: information. This perspective, in a way, teases us into looking at information itself as an agent that spreads through the human population subject only to the constraints of the social and physical environment. And as an agent, one does not have to be Josef Goebbels to know that information can be very powerful.

As legal scholar Jack Balkin (1998) argues from a memetic perspective:

[W]e must resist the natural tendency to think that ideology constitutes a separate, deviant form of social cognition that can readily be distinguished in terms of its operations from the supposedly normal, nonideological forms and mechanisms of thought that characterize everyday reasoning. The mechanisms of ideology are the mechanisms of everyday thought, which in particular contexts produce effects that are both unfortunate and unjust. (p.107-8)

This perspective points out the flaw in much of the use of the term “ideology”: an ideology seems to be an ideology only when it conflicts with one’s own ideology. Nonetheless, ideology has an important conceptual role to play in an information-focused, memetic view of society. It supports Marx’s insight that those with a particular class interest represent it as the general interest of society; this form of wishful thinking is supported by cognitive dissonance reduction, the availability heuristic, conceptual imperialism, and the fallacy of composition (Balkin, 1998, pp. 178-9). All of these, along with personal (and class) interest, are evolutionary pressures favoring one memplex-ideology over others on a macro level. On a micro level, individual facts are likely to be favored or forgotten to the extent to which they help form a grand ideological narrative that justifies one’s position in society (p. 196). Of course, these are merely memetic *pressures*, not *determinants*. As Bertrand Russell (1946) wrote in his history of philosophy, “although social circumstances affect the philosophy of an age, individual circumstances have less influence than is sometimes thought upon the philosophy of an individual. Philosophers are usually men with a certain breadth of mind, who can largely discount the accidents of their private lives; but even they cannot rise above the larger good or evil of their time” (p. 261). While all of us can potentially resist evolutionary pressures of self and class interest on our ideologies, resisting the process of

adopting or fashioning an ideology out of those available to us in our environment is another matter entirely. We are as likely to adopt an ideology that has no relation to those we encounter in our environment as giraffes are to evolve the ability to fly in a few generations.⁴

Just as an explanation of the evolution of ideologies requires a study of social structure, Runciman (2009) argues that all study of cultural evolution should include a focus on three levels of selection: natural, cultural, and social. Three different types of behavior correspond to the three levels of selection: evoked behavior (natural) is a direct and instinctive response to a feature in the environment; acquired behavior (cultural) has been imitated or learned from another person; and imposed behavior (social) is the performance of a social role upheld by institutional inducements and sanctions. The social level of selection is the most recent of the three, and together these three levels of selection combine and interact to create complex evolutionary dynamics.

THE USEFULNESS OF MEME THEORY

Meme theory may for now largely be a novel perspective, but it is not heuristically trivial in the sense used by Maria Kronfeldner (2011, p. 12). It is heuristically *valuable* for the reasons just discussed, and also because meme theory adds a perspective on the origin and development of human culture and the intellectual world that was missing before. Philosophy has been somewhat silent on the question of how we, a very young species, came to have so many ideas in such a short time. Parmenides argued that change is impossible, so that in a sense all ideas must have always existed (Russell, 1946, pp. 49-52). Descartes and Leibniz believed that some ideas are innate, which is reminiscent of Plato's idea that knowledge is a recollection of ideas forever present in our souls (Blackburn, 1996, p. 194, 289). Furthermore, Western philosophy has long been reliant on the concept of the "soul", a spiritual or magical entity that exists outside of the physical realm, and is responsible for conscious thought. If we posit the existence of this hypothetical entity, we can facily explain the development of a staggering array of ideas since our hunter-gatherer days in Africa.

⁴ Runciman (2009) makes an analogous point:

Symphony orchestras could no more have preceded chanting or singing in cultural evolution, or parliamentary democracy big-men or lineage heads in social evolution, than elephants could have preceded bacteria in biological evolution. Imagine what would happen if an archaeologist discovered a series of marks on the wall of one of the Lascaux caves alongside the depictions of animals and people which turned out to be the notation of a piece of music which could have been written by Mozart! The whole evolutionary paradigm would fall apart. (p. 198)

However, if we remain agnostic on the existence of the soul, then our only explanation is the human brain; and we are left with the option of either merely ascribing to the brain the abilities of the soul,⁵ or to defer the question until (hopefully) neuroscience can answer it. Hence, to borrow from Winston Churchill on democracy, meme theory may be the worst explanation of how our species came to have such a wealth and diversity of ideas – except for all the other explanations that have been made. Not only does meme theory, and theories of cultural evolution more generally, explain the development of ideas in a manner consonant with available evidence and without resort to magic, but it is the only tentative explanation that answers, provisionally at least, the question of how our intellectual realm has come to be so densely populated (Gabora, 1998).

Meme theory also suggests an explanation for how our species came to develop such large brains with the capacity for culture and cultural evolution (Blackmore, 1999; Higgs, 2000). Models of evolutionary processes demonstrate that in an environment of memes with both positive and negative fitness consequences, genes for increased imitative ability are progressively favored (even when such ability, if it requires larger brains, entails reduced fitness due to greater metabolic requirements and increased maternal mortality during childbirth). As imitative ability steadily increases, a “mimetic transition” tipping point is eventually reached, at which point brains have evolved an imitative capacity such that memes can spread like epidemics (Higgs, 2000). This tipping point may have been reached approximately 120,000 years ago, when evidence for cultural diversification begins to accumulate first in Africa, and then elsewhere as *homo sapiens* spread throughout the planet (Foley & Lahr, 2011).

Also, as Kronfeldner (2011, pp. 138-9) suggests, meme theory can and is serving a bridging function between different disciplines, facilitating the cross-disciplinary study of cultural evolution. Here is where the simplicity and all-encompassing breadth of meme theory is a strength, not a weakness: it provides a common vocabulary for varied disciplines to share information and perspectives. It also anchors cultural evolution in a metaphor with biological evolution, which may help to keep the former from straying from the confines of the evolutionary algorithm.

⁵ As Runciman (2009) describes this development in the European intellectual tradition that applied not only to the soul and the mind: “[t]he distinction between the ‘natural’ and the ‘preternatural’ could now be resolved by simply absorbing within the first whatever of the second retained its credibility” (p. 214).

Memes and schemas in social representations: a theory for political psychology

When one looks at the variety of representations in existence, one is struck by two things: man's obstinate rediscovery and reiteration of the same themes and his extraordinary prolificness in inventing ideas, urged on by a poetic instinct. A troubling phenomenon, for it sometimes looks as though neither society nor the individual were in full control of this invention. Perhaps an intrinsic power of the mind has been unleashed. (Moscovici, "The Myth of the Lonely Paradigm: A Rejoinder" (p. 967).

As an evolutionary explanation of how humans evolved such a diverse and immense intellectual universe, the meme's eye view may be breathtaking; but it can be hard to make out just what is going on in society. What Moscovici (1988) wrote about the schema could just as well be applied to the meme: "it refers to a simplified representation and is less rooted in the social world" (p. 215). The theory he introduced, and which has been elaborated by thousands of researchers since, excludes from its scope ideas which are too rare, unincorporated into any meaningful whole, or uninfluential to have any social significance. As Wagner and Hayes (2005) put it, social representations are "holomorphic" – individual instances are functionally related as a part of the whole in a society – while individual representations can be "idiomorphic", idiosyncratic and largely unshared ideas held by individuals. All social representations are composed of memes, but not all memes comprise a social representation. The ideas Jesus had were merely memes at the start of his career; but after his death, the memes spread by him and his disciples came to form a social representation which has evolved drastically since.

Other than this, meme theory and social representations share some profound similarities. Owing to their common core as information, both memes and social representations can exist in human minds as well as in recording media. "While representations are often to be located in the minds of men and women, they can just as often be found 'in the world', and as such examined separately. Representations can be preserved on parchment or stone..." (Moscovici, 1988, p. 214) – and, one could add, in books, hard drives, digital screens, and internet servers. Another striking similarity between the two is that social representations are dynamic, mobile, plastic and interdependent (Moscovici, 2001), a description perfectly consonant with the concept of memes in their ecology.

The rest of the similarities between meme and social representations theory could be

described as genetic. While describing the genesis of his concept of social representations, Moscovici (1961/2008) introduced Kenneth Boulding's *The Image* as "a fascinating little book" (p. 7), and went on to summarize Boulding's "image" concept.⁶ Boulding's "image" is essentially a meme, only without the evolutionary theory. In fact, in illustrating the "image" concept, Boulding (1966) anticipated Richard Dawkins' meme-gene analogy by a decade:

[T]he artifacts, that is, the physical capital of a society must be regarded as the result of the structuring of the material substance by an image. There is a close analogy here between the image and the gene. The production of an automobile is a process whereby certain parts of the material structure of the earth are arranged into the form of a previous image. The genetics of the automobile is, of course, much more complicated than that of the horse. It is multisexual and, unlike the gene, the image does not merely exhibit random mutation but has a regular systematic and accumulative mode of change. Nevertheless, it is by no means fanciful to argue that the automobile and other human artifacts are produced as a result of a genetic process in which an image plays somewhat the same role as the gene does in the biological world. (p. 58).

Hence social representations, like meme theory, can partially trace its heritage to an analogy with the gene. Although after introducing the "image" Moscovici went on to distinguish social representations from it, its imprint is clear from a subsequent passage eerily reminiscent of meme theory: "It is as though they [expert accounts in the form of "articles, books, lectures, etc.,"] were genes and atoms that circulate in our images, words and arguments" (p.11).

Meme theory also shares another genetic commonality with social representations: both were influenced by the development of information theory. Norbert Wiener's *Cybernetics* was a profound early influence on Moscovici's thought (de Rosa, 2012), and traces of information theory left indelible marks on the introductory text of social representations theory. For instance, Moscovici (1961/2008) accurately described analogies as a way of "economizing on information" (p. 171), justified by the demands of communication. This echoes the focus of information theorists on devising ways of encoding more information in ever smaller messages (Pierce, 1980).

One final example from Moscovici (1961/2008) suggests a third, methodological

⁶ In describing the early days of social representations theory, and the central role the "image" played, de Rosa (2012) explains that "Moscovici did not replace the more common term of 'image' with that of 'social representation'. In this regard, Jean Claude Abric has repeatedly said, referring to the time when Moscovici's theory began to circulate among his colleagues, 'we still said image!'" (p. 21).

commonality between social representations and meme theory: “Like the radioactive bodies used in biology, it [core terms within a representation, like “complex” in psychoanalysis] can act as a veritable ‘tracer’ that detects the circulation of psychoanalytically derived language or its volume” (p. 158). This evokes the methodology used by Pocklington and Best (1997) to study the evolutionary dynamics of memes in internet discussion forums by tracing word clusters linked to an idea or topic of discussion.

A final genetic commonality between meme theory and social representations⁷ lies in their relationship with Gabriel Tarde, and his laws of imitation. Tarde’s theory may be considered a forerunner of meme theory (Marsden, 2000), or as a superior version, lacking its flaws (Schmid, 2004). Social representations too have points in common with Tarde’s theory, as Rob Farr (1990) explains:

Moscovici does not accept the social determinism of classic Durkheimian theory. He is, in this respect, much closer to the social psychology of Gabriel Tarde, one of the other founding fathers of French social science. Whilst Tarde, perhaps, is best known for drawing the attention of social psychologists to the key role of imitation in social influence he also stressed the importance of invention and of creativity. Individuals are often the *agents* of change in society. Once an innovation has occurred, then, the laws of imitation might help to account for the distinctive pattern of its adoption. This links up with Sperber’s ideas about the transmission of representations. (p. 61)

INCORPORATING MEMES AND SOCIAL REPRESENTATIONS

In fact, Dan Sperber’s epidemiology of representations provides an ideal starting point for an incorporation of evolutionary meme theory into social representations research. Sperber (1985; 1990) starts from the basic proposition that the same human mental capabilities that evolved to support culture must also in some way influence its content and organization. In addition, currently-existing representations will influence the spread of other representations, as will the kinds of information technology available in a culture. For instance, in a nonliterate society without writing technologies, representations that successfully spread will be limited to those that are easily memorized. They must also be in general accord with already-prevalent representations: a

⁷ Another, trivial, commonality between social representations and meme theory is that they have both been criticized by Gustav Jahoda (2002;1988).

representation that sharply conflicts with a prevalent representation is less likely to spread. And, of course, representations that fit well with evolved predispositions in the human mind are favored: representations of dangers in the environment and how to avoid them, or representations that help strengthen social bonds and facilitate cooperation, are likely to spread preferentially.

Second, he posits that the study of the spread of representations will of necessity have to focus on their transformation rather than their replication or reproduction in the sense of precise copying. This owes to the fact that shared information is generally *reconstructed* in the recipient's mind rather than merely reproduced. Hence an epidemiology of representations will more often have to explain why some representations become so widespread and stable as to become properly cultural, unlike epidemiology of disease which only occasionally has to explain why some diseases transform during transmission. In the case of political and scientific ideas, the stability and fidelity with which they are transmitted is likely due to the assistance of information technologies (the media) that promote stable replication.

Third, just as epidemiology is not an independent science covering an autonomous level of reality, neither is an epidemiology of representations: epidemiology studies the distributions of diseases, which are studied in turn by pathology. So too must an epidemiology of representations have a similar relationship with the psychology of thought, for instance schema theory (including an evolutionary psychology of innate schemas). They ought to have a relationship of mutual relevance and partial interpenetration. “[P]sychology is necessary but not sufficient for the characterisation and the explanation of cultural phenomena. Cultural phenomena are ecological patterns of psychological phenomena” (Sperber, 1985, p. 76).

Like Runciman's (2009) theory of cultural and social selection, Sperber's (1985) epidemiology of representations acknowledges that in modern societies, institutions are powerful influencers of the spread of memes and social representations. This is particularly the case in the spread of political ideas. In fact, of all ecological factors (already-widespread memes and social representations) in existence, institutions play the most important role in explaining the distribution of political beliefs (Sperber, 1990). Institutions do not only affect the spread of representations, but they are themselves constituted by representations: “an institution is the distribution of a set of representations which is governed by representations belonging to the set itself” (p. 87).

How memes, schemas, and social representations relate to each other

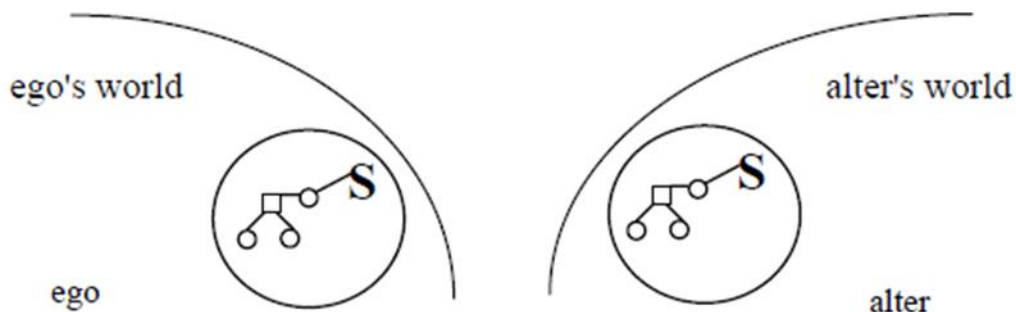
To review, meme theory focuses on the evolution of information, and its scope encompasses information ranging from individual words to entire ideologies. Schema theory focuses on the psychological dynamics of information in the human mind, and its scope is somewhat larger than individual words and somewhat smaller than a worldview or ideology. Social representations theory focuses on the social function of information, and its scope is more restricted, encompassing only socially-shared ideas with multiple components, including entire worldviews. All three are theories of information, with meme theory being almost exclusively focused on pure information, schema theory focusing on information plus individual psychology, and social representations focusing on information and social psychology. To study the role and effects of information in society, insights from all three can be usefully combined.

Wagner and Hayes' (2005) epistemological discussion of the intransitivity of explanations is relevant here. For example, while it is true that everything in the universe operates according to the laws of physics, it would make no sense to *explain* something like one's choice of a friend by physical laws. The matter comprising all human bodies and minds may be subject to the laws of physics, but at each progressively higher or more complex level of organization, from chemistry, to biology, to psychology, to sociology, the explanations of the previous level lose relevance. Each level is to some degree the realm of an emergent phenomenon operating according to its own forces, regularities, and tendencies. Hence it is theoretically possible to "explain" one's choice of a friend by reference to physical laws; but it would take an unimaginable amount of data storage to record a full description of each of the atoms (and their interactions over time) comprising oneself, one's friend, and the shared environment – and that, over the span of a lifetime. Even then, the full "explanation" would be in a form no human could comprehend, let alone recognize or feel satisfied with.

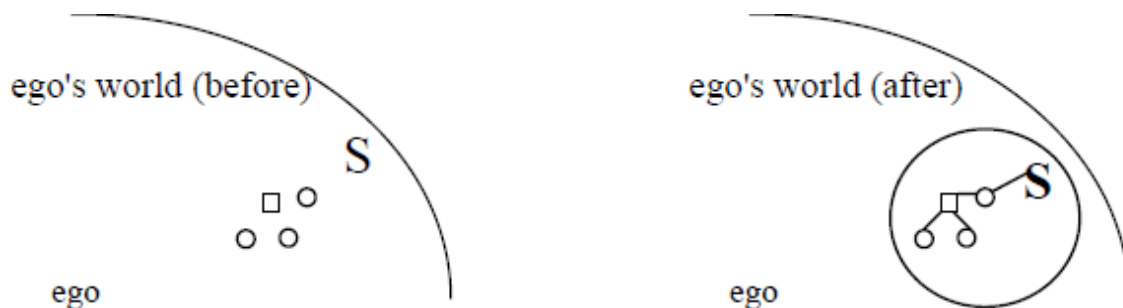
Here too, there is a certain amount of intransitivity of explanations between the levels of memes, schemas, social representations, and political economy (and history, which in a way combines them all along with a record of individual and group action). An explanation of the end of feudalism based entirely on the battle between social representations is as unsatisfying as an explanation of the social representation of an equal society spreading throughout a proto-capitalist, feudal society based entirely on memes replicating themselves in willing minds. But – and just as importantly – a description of social representations is unsatisfying without an explanation of how

ideas emerge, develop, and change in the first instance. So too would a description of the properties of copper wire disappoint if its weight, density, and electrical conductivity were chalked up to its “copperness”. Such is the state of all explanations of social phenomena if their informational building blocks lack an explanatory theory: a creation story, whether evolutionary or of another equally well-supported sort.

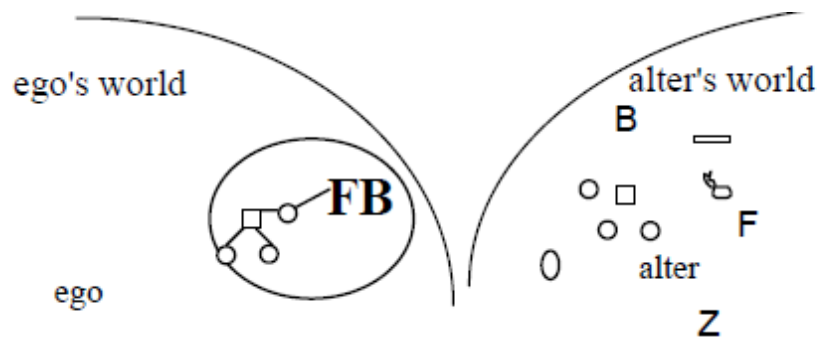
Saadi Lahlou (1996) provides a clear way to describe the overall process of how memes form into social representations, and representations spread through society. His diagrams are taken out of their original context here for the sake of illustration. In the first diagram, there are two people, Ego and Alter, who share an identical representation, comprising identical memes stored in identical schematic structures:



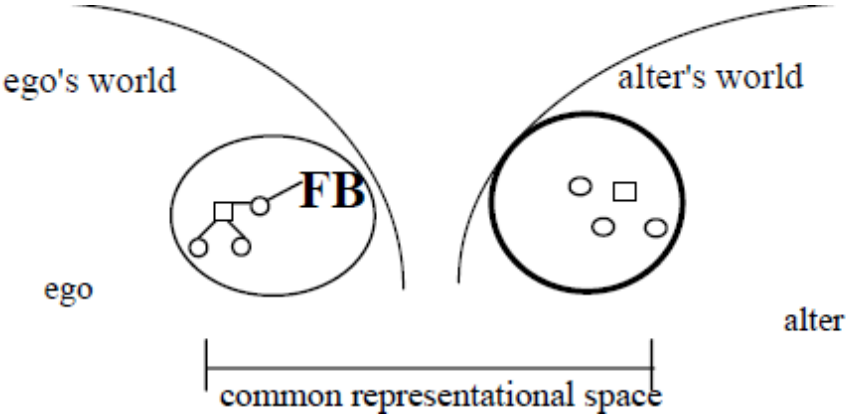
The process by which Ego (and, possibly Alter too), formed this representation was through linkages between memes. For example, Ego may have this representation of psychoanalysis, comprising three circles representing knowledge of three case studies of patients who had bad experiences with psychoanalysis, a square representing a belief that Freud was a quack, and an S representing the belief that psychoanalysis is a potentially dangerous pseudoscience. All together, these ideas comprise Ego’s representation of psychoanalysis:



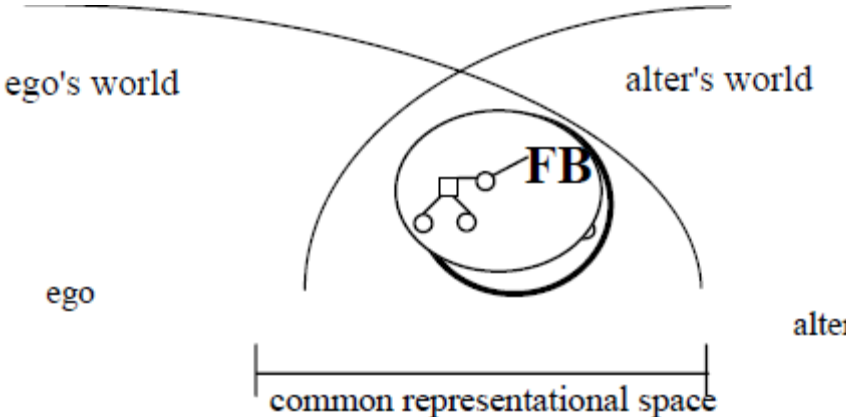
However, what if Alter does not share an identical representation with Ego? Let us imagine a different case, where Ego's representation comprises three circles representing knowledge of three case studies of patients who had fairly good experiences with psychoanalysis, a square representing the belief that Freud was a respected thinker, an **F** representing a belief that psychoanalysis has been heavily criticized recently, and a **B** representing a belief that uncertain scientific theories should be put to a test of proof. This is now Ego's representation of psychoanalysis. Alter, on the other hand, has much the same information as Ego (though the case studies Alter knows concern different people who also had fairly good experiences with psychoanalysis, and Alter's beliefs **B** and **F** are less strongly held). Alter also has other memes that Ego does not, which may be tangentially related: like **Z**, which represents a belief that important health decisions should be left to experts. But while Alter shares much the same memes with Ego, they are not schematically structured like Ego's – in fact, they are not structured at all. Alter does not think about psychoanalysis enough to structure this information into a representation of psychoanalysis. If asked for an opinion on psychoanalysis, Alter would be equally likely to mention any one of these memes, and elaborate an opinion on the fly:



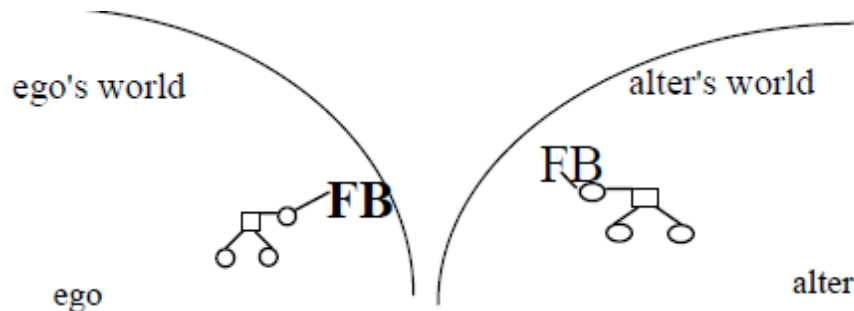
Now, imagine that Ego is having a conversation with Alter, and the topic of psychoanalysis comes up. Ego discovers that Alter does not have a coherent opinion or representation of psychoanalysis, but that Alter knows similar basic facts that make up Ego's representation:



During the course of the conversation, Ego tries to persuade Alter to adopt his representation of psychoanalysis as a science founded by a respected thinker, with many good and some bad results, which has received heavy criticism, and which should be put to a scientific test to prove its worth. Persuading Alter to adopt Ego's representation will require Alter to create a sort of narrative structure comprising the same facts or memes in the same arrangement as Ego's.



Ego proves to be a persuasive speaker, and Ego's representation has spread to Alter, while being transformed slightly in the process. Alter now shares Ego's representation of psychoanalysis. It is not a perfect copy; Alter does not feel as strongly that psychoanalysis pressing needs to be put to a scientific test to prove its worth, for instance. Also, the three case studies of positive experiences with psychoanalysis are slightly enlarged for Alter, because now Alter knows of Ego's similar collection of case studies:



Note that the process of spreading this representation from Ego to Alter was facilitated by the fact that from the beginning, Alter shared much the same knowledge, or memes, as Ego. (The case studies Alter remembered were of different patients, but they were vague enough to be largely similar to Ego's.) Hence, the spread of Ego's representation to Alter involved only the structuring of unorganized memes. Had Alter not had any memes relating to psychoanalysis whatsoever, Ego would first have had to teach them to Alter, possibly running into resistance. Alter may be insecure about a perceived lack of knowledge, and hostile to anyone who seems to know more. Also, it would be even more difficult for Ego's representation to spread to Alter if Alter already had a representation of psychoanalysis composed of the same memes but organized differently: for instance, if the three positive case studies were relegated to a subordinate position due to a stronger weight granted the heavy criticism psychoanalysis has received. It would be more difficult still for Ego's representation to spread to Alter if Alter had entirely different memes comprising a radically different representation. For instance, if Alter had knowledge of dozens of studies describing a history of failure for psychoanalysis, and no knowledge of any positive experiences anyone may have had in psychoanalysis.

This point can perhaps be illustrated in a different fashion, by imagining one's politics as a constellation. The stars represent memes, facts of some political relevance; the imagined lines

between the stars that make up the constellation represent the woven narrative that pieces together various facts into a political perspective or ideology. On a very clear night in the desert, there is a maximum of visible stars – and every constellation is traceable in the sky. However, no one’s brain contains every single political meme in the world, or *every* fact of *any* relevance to politics. In the metaphorical night sky each one of us sees, there is never a maximum of visible stars – we all see a different assortment corresponding to our individual knowledge base. Hence, it is practically impossible for any one person to truly know every political perspective or ideology as well as its most well-informed adherent; many of the facts that comprise their narratives are invisible to us. Arguments between adherents of different political persuasions are like two people trying to see the same constellation in two skies with a vastly different assortment of stars. The figures that well-known constellations are supposed to form are already somewhat difficult to imagine, even in the one, identical night sky we all see. So too, even with a broadly shared set of memes, it can be difficult to agree on the political narrative to weave with them. This is all the more difficult here, where the metaphor is strained too far: seeing the exact same stars is not equivalent to having the exact same memes. At a neuronal level, one person’s schema may be significantly different than another’s, even if the meme – as disembodied, abstract information – is the same. If my schema for inequality does not comprise any neuronal memory of a negative experience had as a result of inequality, and your schema for inequality is neuronally coded with viscerally painful memories of being dominated and powerless, then... we do not really have the same schemas at all. Embodied information, in the form of individual schemas, can differ even when the abstract information is the same.⁸

The way that we perceive our own knowledge may be largely similar to the way we perceive our field of vision. An explanation in the psychology of perception posits that our experience of perceiving a rich visual world whenever we look out into our environment is entirely illusory. According to the theory, our eyes do not scan a field of vision, sending details

⁸ Echebarria-Echabe (2012) writes:

Culture provides a general frame about what is acceptable or not. ... However, personal experiences serve also to re-shape and re-elaborate these group influences. Thus, attitudes are strongly linked to personal experiences. These explain individual variation within the same group.

This association with personal experience makes attitudes extremely dynamic. They become influenced not only by group but also by personal experiences. (p. 198)

to be recorded by the brain as it builds a complete, movie-like representation of the outside world - a representation modified in real-time as the eye reports movements and new additions or subtractions. Rather than sight being a passive process whereby a complete representation of the outside world is projected in our mind as the information from light streams through our eyes, we never actually form complete representations of the outside world at any given time. Instead, we are constantly building fleeting representations, one at a time, of individual objects or features in our field of vision. Once our fovea, the part of the retina with the highest relative acuity, shifts focus to another object or feature, the previous representation dissolves into a haze of undifferentiated features. Our vision *seems* as if it is continuously capturing all or most of the richness of a scene, but this is only because our fovea, during the course of the many saccades our eyes make each second, can quickly attend to enough individual details to create the illusion of a consistent and complete stream of vision. Although it seems that we perceive all objects in our line of sight concurrently, this is an illusion. The outside world itself is the only representative model we have, and it is accessed only if and when it is needed by quick saccadic eye movements (Blackmore, 2005, pp. 78-92).

In a similar illusion operating in the way we perceive our knowledge, we feel as though we have a largely complete set of knowledge about the world. We may know of gaps, but they do not bother us much or dissuade us from considering our knowledge to be nearly, or fairly, complete. The gaps in our knowledge we are aware of are usually considered to be in unimportant, trivial areas (like when driving, we feel like the sky is part of our rich, movie-screen field of vision – we just choose not to focus on it). We even feel that we understand ideas, political views, and ideologies we disagree with. In fact, we may feel that we understand them better than their (benighted) adherents do themselves – our superior understanding is, after all, what keeps us from being adherents ourselves.

However, from the theoretical perspective outlined here, this perception is certainly an illusion. The memes we have, and the social representations we share, are never more than a miniscule fraction of the total in existence. Yet with the sort of unabashed pluck and overconfidence typical of human psychology, we tend to believe that the narratives we form to explain the world – from the world of our relationships to the world of politics – are the best possible explanations for the facts. *The* facts – not *our* facts, that restricted set of facts we know,

or the memes that happened to reproduce in our brains.

How memes, schemas, and social representations create a satisfying political psychology

An integrative social representations theory for political psychology would focus on those representations that are the currency not only of political debate, but political agreement as well: the “welfare state” as well as “free markets”, “humanitarian intervention” as well as “human rights”, “state-led development” as well as “democracy”, “global warming” as well as “environmental protection”, the “preferential option for the poor” as well as “capitalism”. These representations are, like less political representations (psychoanalysis, for instance), an important area for social psychology to elucidate. They are political, not only because their content is that of political policies, but because in a very real sense, they compose what *is* the political realm. Everything in the political realm in modern societies can be traced to a core of information; information, in a very strong metaphorical sense, is the DNA of politics. Hence a political psychology capable of answering the most vital questions in its area of study will focus on the representations that give substance to, form, and make the political realm what it is.

These are the ideas that Max Stirner (1844/1995) appropriately termed “spooks” – abstract ideas about incomprehensibly large numbers of people and the incomprehensibly complex relations between them. The conflict between spooks and the realities they purport to describe is illustrated in the following example: “He who is infatuated with *man* leaves persons out of account so far as that infatuation extends, and floats in an ideal, sacred interest. *Man*, you see, is not a person, but an ideal, a spook” (Stirner, 1844/1995, p. 72). Today, the brains we have evolved are capable of entertaining memes of all sorts, including spooks like “man”, “democracy”, “free markets” and the rest. But when our brains were still evolving this capability, we lived in small forager bands tied together in a cooperative structure by mechanisms of “aggressive egalitarianism” (Boehm, 2012). In these ancestral bands, spooks would be in short supply: any idea that could evolve about “society” would be limited to describing a total number of people small enough to all sit around a bonfire. (Perhaps the first spooks that evolved described outgroup bands, whose members were not well known.) There would have been no ethnicities, “races”, nations, or political philosophies – the only prominent spooks would have

been religious. But once sedentary, agricultural societies emerged, a breeding ground for spooks appeared. Ideas could be formed that purported to describe society and its relations, but the referent of such ideas could never be directly witnessed in its totality. We can never be certain that such spooks accurately describe a reality that we can verify with our senses; at best, we can only ascertain whether these spooks are in accord with the evidence of empirical investigations into social phenomena. And evidence, no matter how persuasive and how large a body of it we have at hand, is by its nature incapable of perfect correspondence with the underlying reality it describes. Plus, we *never* obtain the full body of evidence, only the evidence available to us; the vast majority of possible evidence has been ruled inadmissible, in the sense that only a fraction of the total of relevant memes ever makes an appearance in the court of our minds.

Therefore, an integrative social representations approach to political psychology would look not only at social representations, but their constituent memes. As Lahlou's (1996) illustration makes clear, social representations can spread only on the basis of reorganizing memes into roughly the same structure as the original representation. Without the bits of information that comprise a social representation, there is nothing to be spread. A blueprint is not enough to construct a building – bricks and mortar are required as well. And in tracing the spread of ideas that form representations, a primary focus must be on the media, which has always been at the core of social representations theory (Rouquette, 1996).

This suggests the use of Moscovici's (1961/2008) "tracer" method: investigating the spread of individual bits of information that either already form part of an existing social representation, or carry the potential of forming one. For instance, by 2003 a social representation of the "need" for a preemptive war on Iraq was widely distributed among the U.S. population.

For this to have been possible, several memes had to be widely distributed first: a link between Saddam Hussein and 9/11, fabricated evidence of an advanced nuclear weapons program, selective facts of Hussein's past brutality, etc. These memes can act as potential tracers to track the development and spread of what was eventually to become a widely-distributed social representation. So too can memes that are not yet structured into a widespread social representation be tracked to forecast the emergence of new social representations: for instance, the 99%/1% dichotomy meme is a potential tracer of a social representation of a new economic

order that may become widely distributed.

CONCLUSION

The development of computers and the internet has made *information* – what it is, what it does, and how important it can be – part of common knowledge. Less common is the perspective that cultural information evolves in much the same way that organisms evolve. It is this perspective that shines much-needed light on the political realm, particularly on how the information available, prevalent, and accessible in a society constrains and affects which political ideas and social representations will form and spread. Meme theory provides an explanation for how information evolves; schema research demonstrates how the human mind processes information, explaining some of the evolutionary pressures operating on cultural evolution at the individual level; and social representations theory explains how structured complexes of information disseminate and develop in society.

Just as biological evolution is likely to operate simultaneously on the level of genes, individuals, and groups, the evolution of ideas operates on different, interacting levels. Individual bits of information (ideas, facts) evolve on one level, and structured complexes of widely shared information (social representations) evolve on another level. Both levels affect each other: a widespread social representation may powerfully affect the spread of individual ideas, and the distribution of individual ideas may powerfully affect which social representations can form or spread.

Incorporating meme and schema theories into social representations research offers a satisfying way to investigate the most pressing questions in political psychology. To understand why some social representations about a political issue (for instance, how an economy works, and why one form of economic organization is better than another) are prevalent, and others are marginal, we can examine the individual ideas (memes) that collectively constitute these representations. Inspired by Moscovici's "tracer" method, we can track the origins and sources of dissemination of these individual ideas to arrive at a better understanding of how the overall social representation was formed and spread.

This need not be a mere academic exercise. Ideally, political psychology and the tools we use to

understand it should provide the knowledge we can then use to change the world we have previously described. The most urgent political problems we face – climate change, the dysfunction of economic systems, war, etc. – are to a great extent fueled by information or its lack: ignorance, the strife of competing social representations, propaganda, misinformation, etc. How can citizens of the biggest carbon-emitting countries come to accept the scientific consensus on climate change in the face of climate denial misinformation and ignorance, and create the political will to implement solutions? How is the evolution and spread of economic ideas influenced by powerful institutions, and how does this limit the menu of policy options citizens are aware of to deal with economic problems? How can citizens in countries threatening each other with war come to understand the social representations held by both sides, and reinterpret rather than be convinced by their side's propaganda, such that compromise is favored over conflict? As these illustrative questions suggest, understanding the competitive evolution of ideas and social representations is of utmost importance for a political psychology capable of offering solutions to the political problems of today.

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