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Propagation of social representations

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The propagation of social representations.

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Abstract : Based on a minimal formalism of social representations as a set of associated cognems, a simple model of propagation of representations is presented. Assuming that subjects share the constitutive cognems, the model proposes that mere focused attention on the set of cognems in the field of common conscience may replicate the pattern of representation from context into subjects, or, from subject to subject, through actualization by language, where cognems are represented by verbal signs. Limits of the model are discussed, and evolutionist perspectives are presented with the support of field data.

1. Sharing objects

A group can only be called such if, among other things, it shares a common « reality », that is a set of objects, material or other, upon which and with which its members interact. This trivial precondition seems confirmed by any superficial observation of human groups, and has been recognized since the beginning of social science (e.g. Durkheim, 1912, 1991, p. 64) as a prerequisite to any form of human social life. For instance, communication, as any form of co-operation, is not possible without the basic sharing of some « context » or « content » between actors.

Still, as for many "trivialities", close investigation reveals that what seems at first obvious is not so simple to describe. Centuries of philosophical and physical research still have not solved the first part of the problem : what are « the material objects » of our common reality, what is the physical context we believe to share with other beings ? At best, research in Physics or Epistemology, considering that we have direct access only to representations, have sent back the problem into the domain of the other fold of the question : « what are the "other objects" -that is : representations- that we share? ». For instance, Zafiropoulo (1967, p. 5) considers that :

« Reality is at each age the set of concepts used to classify our perceptions (...) in other words, reality is a necessary but transient definition ».

In fact, it seems that the core of the problem is "what is the nature of that *something* that observers believe to share?". And in this question every single word is a trap in itself. So we shall leave it open, in its complexity, for future generations. Our point here will be a more modest approach, in a genetic perspective, of the term « share »: how do we *come to share* common objects, whatever their nature ?

We shall first focus on how social representations propagate in a population. After giving a minimal definition of how a social representation can be described (section 1), we will illustrate how the sharing can be figured (section 2), then propose a basic model of propagation (section 3), with its limitations (section 4), and some empirical illustration (section 5). In so doing, the model will be extended, with a more detailed approach of how social representations are embedded in a global context, including « material » objects (section 6). We conclude (section 7) with the presentation of an evolutionist perspective, in which the propagation mechanism appears as a key feature of social representations.

2. Representation as an association of cognems

Social psychology, exploring the question of "community" and "meaning", came up with the notion of *social representation* (Moscovici, 1961, 1982, 1989). This productive concept is more or less a scientific name for those « other » (non material) objects that are shared in a group. Those objects that we all believe to exist, but which are so complex and numerous that no discipline has yet been able to construct a complete taxonomy within a single theoretical framework. This is, in our view, derived from the nature of social representation : as it is a

means to convert perception (in the large) into action, and vice-versa, it must be a flexible and versatile kind of tool, subject to many avatars.

Social representations have been widely explored, and were given numerous definitions (Moscovici, 1961, 1976 ; Jodelet 1984, 1989 ; Doise, 1985 ; Flament 1993 ; Harré 1989...). They vary slightly in scope and content, but agree on what Flament (1981) calls a minimal statement :

- a representation is a set of *cognems* ("cognème", Codol, 1969), organized by multiple *relations*
- those relations can be oriented (implication, causality, hierarchy...) but all can be "derived" into a symmetrical relation expressing the vague idea of "going together" (....)
- this relation, generally, is not transitive : if A goes with B for some reasons, and B goes with C for other reasons, it may well be that A and C have no reason for going together".

This approach, which founds the current empirical approach of social representations and the theory of the core or « noyau central » (Abric 1984, 1994; Flament 1992 ; Guimelli & Rouquette 1992 ; Guimelli (ed.) 1994) is mostly formal. It tells little about the functional aspects of social representations, but gives a good basis for investigation.

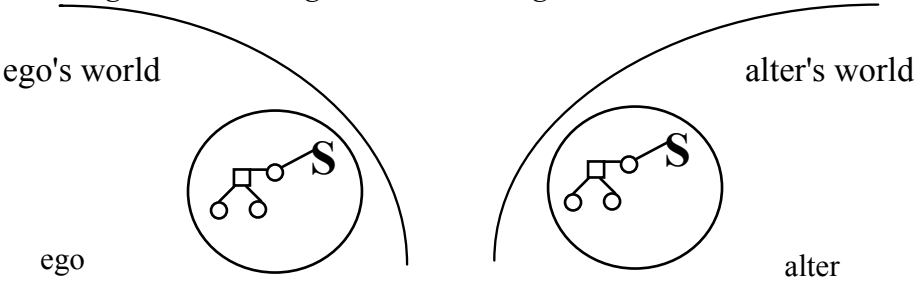
Current cognitive research, insisting on the multimodal aspect of cognition, suggests that *cognems* are of heterogeneous nature. Any object that may appear in the field of individual conscience seems a good candidate : perceptions, emotions, memories (which could be considered as « replays » of the former categories), motor or hormonal commands... May be also « objects » not emergent to conscience may pretend to the status of cognems, but this is less clear. We like this definition because it is only a formal one, applying to the concept of representation without taking options on functional aspects. It is compatible with our view that representation should be considered as an object in itself, and not as a representation « of something ». And that is precisely why, as we shall see, it can propagate so easily. For us, *representation is what it represents* (Lahlou, 1995) ; see also Wagner, in this issue, for a similar view. Let us stay with this ambiguity, and simply keep in mind that cognems include more than verbal or iconic items, and that they may themselves be rather complex elements. In other words, "a social representation is a structured set of cognitive elements" (Rouquette, 1994). It is upon this vague but consensual definition of social representation that we shall rely here, assuming that this formalism is fit for *describing* social representations. So, let us say that there are "cognitive elements", or *cognems*, that a set of cognems that are associated ("going together") constitute a "representation". And that a "social representation" is a representation that is « shared » by a group.

3. What sharing means

Having something in common can be illustrated by a simple figure. Two subjects, Alter and Ego, each live in their « own world of perception » (Von Uexküll, 1921), which respectively include their own perceived objects. Each object is an association of cognems. Some of these associations are common to the Ego and Alter. This means that, for an external observer (let us call him « Thomas ») describing Alter's and Ego's worlds, there seems to be something

identical in each of those worlds. It can be represented (within Thomas' conventions) as follows :

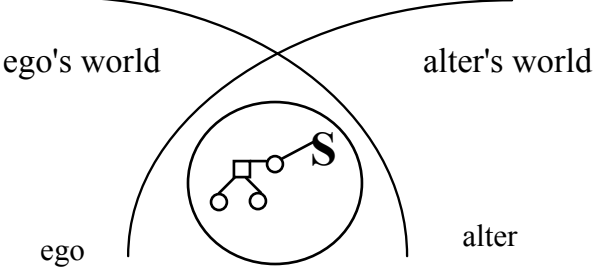
Fig. 1 : Alter & Ego have Something in common



What they have in common is here symbolized as a set of cognems recognized by Thomas : small squares, circles, and an « S » in the figure. Let us suppose « S » is a special kind of cognem : a sign of a common language that Ego, Alter, and Thomas all know. To make things simple, let us suppose that what (Thomas thinks) Ego and Alter have in common is the representation of a chair. And S stands for the word « chair ».

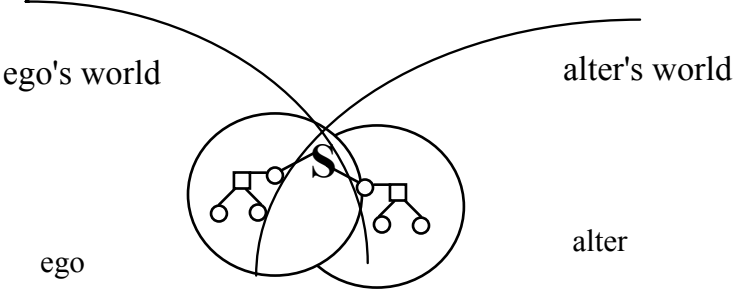
Another way Thomas can represent the situation is :

Fig. 2 : Figuring the sharing of representation by the sharing of cognems



In doing so, he supposes that the representation of the chair is strictly identical in both Ego and Alter. So he may prefer to restrict prudently to considering that only the explicit, overt signs that he can observe are common to Ego and Alter.

Fig. 3 : Figuring the sharing of representation by the sharing of signs



In doing so, he will only assume that there is at least some signs in common, and probably something else, which is more difficult to assess, because an external observer can never be quite sure of the limits of what is in common between Ego and Alter.

This last figure, close of Wagner's (1994) calls for some more comments. *Cognems* are difficult to observe. To the external observers, only *signs*, that is perceptible stimuli, are accessible. It is *probable*, but not *certain*, that signs are the material cognems are made of, since each individual constructs his own representation of his world from perception. Internal states, considered from the point of view of the subject, undergo a very similar treatment to "external" perceptions. Or, better, all perceptions are at the final stage internal, and therefore, of the so called "external" objects, in the mind are only manipulated internal images or representations, which Minsky (1985) calls "simuli".

An ancient idealist position (Parmenides) states that "One cannot know something that doesn't exist, nor state it ; since what can be thought and what can exist are the same thing". But this is a very complex issue, so we do not wish to venture further at this stage. For the purpose of our model, let us only consider that, among cognems, there are some which can be elicited in a public space, which we call *signs*. In figure 3, S, the common part of the representation, will at least be constituted by signs. Of what are not signs, we shall not speak, because they cannot be talked about. Following Wittgenstein's (1921) final line of his Tractatus : what cannot be spoken about, must be kept silent. Only overt signs are accessible to observers. Cognems will be used for our modeling purposes, but for empirical investigations, we shall keep to signs.

Let us call U-language (Lahlou, 1990, 1995), the representational space of an individual. The U-language of an individual is a formal space that may contain all the possible combinations of his cognems. Roughly, it contains everything that this individual could possibly perceive with his sensory and mental equipment. The U-language contains, among other things, what the subject would call his *world*, that is what he believes to exist. But it contains more, possible perceptions, just as the natural language may contain sentences that have never yet been written or pronounced, but still would be a combination of existing words. We need this space for formal purposes : there must be a place to inscribe the new representations.

We shall consider that representations are common to a set of subjects (A_i) if :

(*condition a*) their constitutive cognems (c_j) exist in the U-language of each A_i

(*condition b*) those (c_j) are associated in the world of each A_i

Technically, only signs are accessible to empirical research. So, for research purposes, we shall admit that representations are common to a set of subjects if :

(*condition a'*) their constitutive signs (s_j) exist in the U-language of each A_i . This condition can be assessed by checking, verbally or otherwise, if A_i recognizes each s_j .

(*condition b'*) if those (c_j) are associated in the world of each A_i . This condition can be assessed by eliciting free association by A_i , e.g. with the methods presented by (Guimelli & Rouquette, 1992), (Moliner, 1994) or (Lahlou 1993).

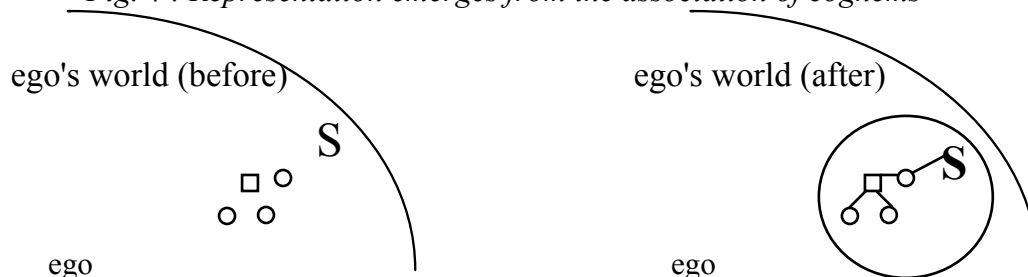
Many field works (Jodelet & Ohana, 1989) have evidenced that there *are* indeed numerous shared representations, in the restricted and empirically accessible sense we have just described (conditions a' and b') : social representations are of that kind. This mental epidemiology, showing us social representations as endemic in a population brings the question of : how does this come ? Chance is no sufficient explanation for such a widespread and improbable distribution of complex objects.

4. Constructing representation

We believe representations diffuse in a population by two ways : spontaneous emergence, and communication, although research has until now mostly focused on the latter. Our basic model allows simple description of the processes of emergence and diffusion, which are similar anyway.

If condition a) is satisfied, that is, if the subject's U-language already contains the necessary cognems, then emergence of the representation simply comes by associating durably those cognems into a pattern of Ego's subjective world.

Fig. 4 : Representation emerges from the association of cognems



What can create such association ? It seems that any focus of the subject's attention on the set of elements « as a pattern » will do the trick. Then, the subject's *memory* will fix into durable association the actualization of this set of cognems, that was once mere co-occurrence, or succession, in the field of focused conscience. This is a trivality. Let us describe how the process can propagate representation.

For example, suppose neither Ego nor Alter have ever heard about the concept of « finger-bowl ». Now Ego enters a French restaurant, orders sea-food, and plays with the objects on the table, on which lies a finger-bowl. He tastes the lemon and water in the cup. The waiter, passing by, seeing Ego's strange behavior, tells him « This is a finger-bowl, sir. It is not for drinking, but for rinsing your fingers after eating sea-food ». Thomas, sitting at a table nearby, observes Ego, and assesses, as he sees Ego tasting the water, then listening to the waiter, that Ego has constructed the representation of a finger-bowl, connecting the sight, the feel, the taste, the functional script, the meaning, the name... Thomas identifies this representation - that he supposes Ego has just gained - with his own social representation of the finger-bowl. To sum up, Ego, having already in his world the objects : water, bowl, lemon, finger, sea-food, the experience of grubby hands, and some other relevant cognems (*condition a*), has associated them (*condition b*) in a pattern that is the representation of « finger-bowl ». He could do so because the situation he lived in the restaurant presented him the various components (cognems) as a bundle. This representation has all the social and functional aspects of a social representation : it belongs to a given culture, as can be stated by Thomas, or the waiter ; it links mental schemes to a certain reality, it is a means of achieving some concrete goal, etc. As we shall see later (section 5) this is not accidental : this representation was framed by a social context pre-existing before Ego's visit in the restaurant, and transferred into Ego's mind.

Let us now suppose that the next day Ego meets Alter and shares with him his new knowledge.

He describes, using natural language, the situation, and the object : « I have discovered yesterday a new concept when I ate in a French restaurant. It is a bowl, with hot water and a slice of lemon in it, and you use it to rinse your grubby fingers after eating sea-food. It is called a finger-bowl ». As the bowl, the water etc. are not physically available in the immediate common context of Ego and Alter, Ego uses words to actualize them in the common representational space, so that they constitute a set presented to Alter's attention. Ego does this so that Alter's memory « will fix into durable association the actualization of this set of cognems, that only was once co-occurrence, or in succession, in the field of focused conscience ». In the end, we (or eavesdropping Thomas) can suppose Alter has now internalized the representation of the finger-bowl. This can be easily assessed by investigating Alter for conditions a' and b' , with protocols that are left to the imagination of the reader.

So the process is progressive: first, Ego actualizes the relevant cognems in Alter's representational space. Then Alter's attention focuses on the pattern they make. Then Alter's memory fixes the association between cognems. As we have stated, this is only possible if Alter previously has the relevant cognems (c_j) available in his representational world (condition a), a premise that Ego will probably check if he is not sure that Alter has them. Another condition is that Alter also has available the set (s_j) of signs representing conventionally all the relevant c_j , since the propagation from Ego to Alter will be done through the use of (s_j). This checking (usually considered as unnecessary between subjects of the same culture) is a preliminary phase. All this process can be figured as follows :

Fig. 5.1. : Preliminary : ensuring Alter has the right basic cognems

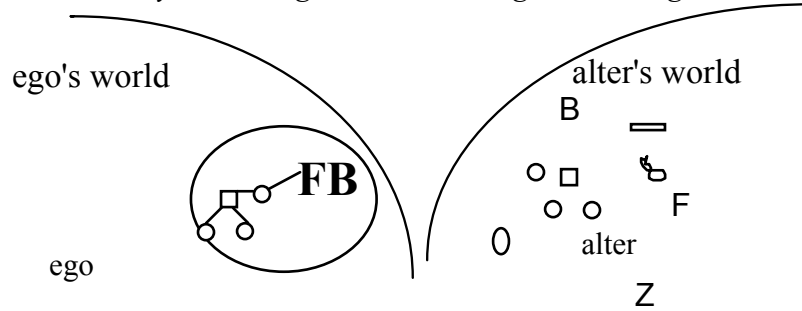


Fig. 5.2. : Actualizing the cognems in a common representational space

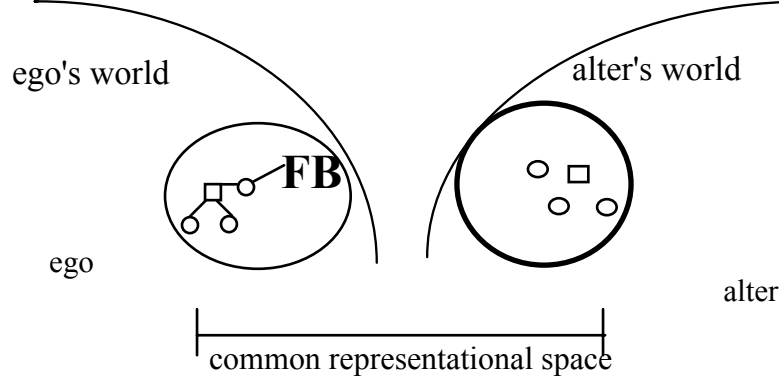


Fig. 5.3 : Focusing attention on the pattern of the set of cognems, and naming them as a new representation

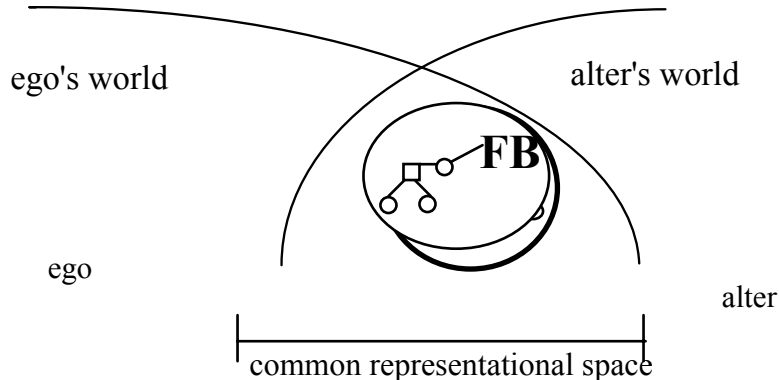
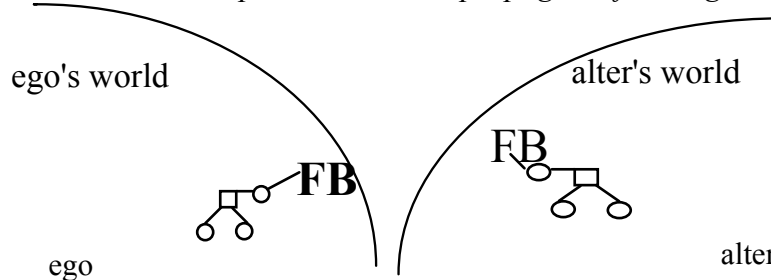


Fig. 5.4 : Final state : the representation has propagated from Ego to Alter



To summarize the two propagation processes, representation has propagated (from the context to Ego, or from Ego to Alter) by replicating, in a way that is a bit similar to viruses. Ego's representation created a replica of its pattern within Alter by using Alter's own cognems, and having Alter's mental processes binding them in the right pattern.

It is worth noticing that, in propagating to Alter, the representation has not disappeared from Ego. Unlike matter, information does not obey to the law of mass conservation (Brunet, 1990). It could even be said that on the contrary it probably reinforced in Ego : persuading or

teaching someone is a well-known way of reinforcing belief and learning. This can be accounted for by the model : when actualizing the cognems in the common representational space, Ego not only focuses Alter's memory on the representational pattern, but also his own, hereby strengthening his own associations between the cognems.

Our model more or less generalizes and formalizes the process described by (Sperber, 1989) in his epidemiological approach of representations :

« Among mental representations, some -a very small proportion - are communicated, that is bring their user to produce public representation which in turn brings another individual to build up a mental representation which content is similar to the initial representation. Amongst the communicated representations, some -a very small proportion - are communicated repeatedly and eventually come to be distributed over the whole group, that is have a mental version within each group member. »

Sperber calls cultural representations those widely and durably distributed representations ; clearly, they could also be called social representations.

Being a handy simplification is the purpose of models, and this simple model easily claims to account for the spreading of representations within large populations of humans. It also pretends to account for the fact that those representations can be adapted to an external context, since -as we have seen in the first part with the example of the finger-bowl- any object can propagate its own structure as a representation in the subject's internal world, through the mere process of perception and attention. Humans, and non-Human objects have a symmetrical role in propagating representations ; the difference being is that Human-to-Human communication tends to favor using a system of signs, when non-Humans-to-Human tends to use more perceptual cognems.

But of course, our model is too simplified. No one would expect that a model using a couple of signs and figures could account for phenomena which we know use configurations of billions of neurons. Let us examine some of its limits.

5. Limits of the model

5.1. Not all cognems are overt signs

Internal representations have other components than signs, e.g. kinesthetic, emotional... They can hardly be abstracted from their sensory-motor context, as one can expect from their behavioral function. The material on which the researcher should ideally investigate is what Flament (1989) calls "a praxeo-discursive corpus, including the record of all practice and discourse of (the) population". In fact, research mostly focuses on verbal signs, and some other overt behavior accessible to observation. This is a strong limit to applying or falsifying the model. All that can be checked is the transmission of the (sj), and, even with brain imagery, the observer, external by construction, will never have access to the cognems (cj) which remain theoretical objects.

Still, as overt (sj) are precisely the elements used by Ego and Alter to propagate the representation, this may not be so crucial a limitation. In fact, a properly falsifiable theory would be one that defines social representations as only constituted of (sj). (And indeed a closer epistemological look at our formalism would unveil that it is actually the case in our model, since (cj) is a set of objects *in our descriptive formalism*, therefore having the status of signs.)

Still, one should keep in mind that what is transmitted through signs is more than the signs themselves. Participants already share a large amount of experience which is not observable during the transaction, but nevertheless is active in the process. For example, when Ego says « water » and « lemon » he actualizes in Alter's conscience more than the words themselves, a complex and vast network of multimodal memories of Alter's past experiences with waters and lemons. Then, what Alter will bind together as the representation of the finger-bowl will probably be a complex multimodal set of cognems including those memories, and not only the observable signs which Thomas heard Ego pronounce. Through communications of words or other observable signs, more can be transmitted than the perceptible (signs) part. It is like manipulating a suitcase by the handle. One can pass it to someone else just by passing the handle.

5.2. *Not all mental representations are social representations*

The individual representations of a so-called same social representation vary slightly in content or pattern from subject to subject. And, as can be empirically assessed, some of those differences can be systematically linked to specificity of the subject (e.g. gender, age, social class...). For instance, Lahlou (1992, 1995) showed that, although the social representation of « eating well » is similar within the French population, some aspects of the representation are more developed in some segments of the population. The nuclei of « desire » and « filling up » are more developed in the young, while the elderly develop health aspects with the nucleus of « not too much fat or sugar », etc. This type of result, where the basic nuclei of the representation are more or less developed and salient depending on the situation of the subject, is common in representation studies (e. g. : Di Giacomo 1980, Guimelli 1994).

This raises the problem of the limit of the social representation, which is a fuzzy object.

Whorf (1927) introduced the terms *connection* to distinguish between the *associations* that are idiosyncratic to a subject, and *connections* which are systematic associations within a population. It seems that this distinction is a good way to recognize, empirically, what can be considered as « social representation », and what cannot, but can only be considered as individual mental representation. In this perspective, social representations are the common part of internal representations, as assessed by the observer. As stated earlier, the empirical approaches derived from the social representation core theory have come up with investigation methods that allow dealing with that problem.

5.3. *The complexity of the social representations*

Our model is too simple to account for the construction from scratch of the attested, complex, real social representations, as observed in the wild. There is a technical impossibility of building a formal model that could compute social representations in their richness. Human social representations are products and nurture for the human mind, and what is known of the complexity of brain physiology is enough to discourage any sort of full scale modeling of its process with the only tool of words written on paper.

Albeit this limitation, the model can be useful if taken as an image of an incremental process of collective representation building. What it cannot account for at once, it can account for by iteration.

Even when staying within the narrow boundaries of the model, providing that they start with a large number of cognems (e.g. : their perceptions) Ego and Alter can progressively construct together a common world containing a large quantity of social representations, some of which may be very complex. For the system works by accretion : any existing representation can be used just as another cognem, and be connected to others in order to construct a new representation. This, in a virtually endless combinatory process since, as we have stated, creating a new combination does not destroy the existing ones. In this respect, representation propagation is far superior to any material system, whose dissemination is limited by the law of mass conservation. And, indeed, cultures are very complex sets of representations, replicated in very numerous individual representational worlds of the subjects which constitute the cultural population.

This progressive aspect can account for such an epidemiology of such complex patterns as are observed in the wild. One should bear in mind that what we have described, with a simple model, takes places continuously during an individual's life, allowing him or her to construct representations of millions of objects ; objects which are constantly confronted with the environment or other subjects' representations. Only this permanent modeling of the individual representational world to the subject's environment ensures the persistence of a content of his inner world compatible with the outside worlds, including the worlds of the other humans. To give an order of magnitude : we have manipulated in our figures a dozen signs, where a human brain contains more billion of neurons. If we represented the visual experience of a twelve year old kid with a continuous 35 mm film at the usual cinema speed of 24 frames per second, the film would be about 800 000 km long, enough to go to the Moon and back. So, our 8 cm schema is a rather simplified model. But one can imagine that, repeated and combined billions of times, the combination and binding of cognems may eventually yield the complex representations that we can observe in the everyday life.

5.4. *Replication is only approximate*

As stated earlier, Ego and Alter do not, probably, dispose of the exact same set of cognems. Nor do they link exactly the same set of cognems (cj) with the same set of signs (sj). For, as Cyrulnik (1989, p. 84) writes :

« (...) a living being can perceive, through the lens of its internal world, only the data that his sensory and neurological equipment can process. Each objective world is therefore different from one individual being to another, since our sensory organs and our brains are different »

What is true from species to species is also true from a specific human to another, since their individual histories (and hence memories) are different. This state of affairs implies that replication of the representation will not be perfect from subject to subject. In other words, the representation undergoes a small mutation when replicating. This mutation, which justifies considering social representations as populations of individual representations (Lahlou, 1995), has interesting consequences in their adaptive capacities.

As social representations are a means of surviving by producing efficient actions, adequate to the environment (e.g. : not drinking from the finger-bowl, although some representations have a more dramatically selective role!), the existence of a large number of variants facilitates the evolution of the global population or individual representations towards more efficiency. For humans favor to host efficient representations, and spend a large amount of time « seeking for information », that is, trying to select for their internal representational fauna the best representatives available ; just like Darwin's pigeon breeders did with their birds.

6. Social representations, context, and social constructionism

Accepting the hypothesis that representations can replicate so easily, one would be tempted, adopting a completely idealistic view, to propose a social constructionist view of reality, uniquely based on representations. In this perspective, humans would collectively build a common Umwelt constituted only of social representations. This standpoint is appealing for it allows describing all objects, material or not, with the same formalism, and can be developed with some coherence if applied to description of the world by a given observer (e.g. : "Thomas"). Which is, in fact, the general case, for description is always description by a given observer. Still, pragmatic approach suggests that it may be more practical to continue distinguishing a « reality », which can be defined as the set of objects common to a population, immaterial and material, even if further research may someday prove that the latter are a subset of the former.

We shall here give a short example, more realistic than the model, of how representations propagate. This description will not only involve the social representations, but the context in which they occur. For no representation can be isolated from the global setting in which it is produced and with which it interacts in the course of global social evolution.

6.1. Language is not a transparent tool

Investigation on the social representation of « eating » in the French population, by statistical analysis of lexical data (1) obtained by free association on the terms « manger » and « bien manger » on several French samples ranging from 1600 to 2000 subjects (Lahlou, 1993, 1994, 1995) showed that social representation of eating in France is made of 6 elements, or nuclei : *desire (libido), take, food, meal, filling up, living*. These nuclei are easily understandable, their link to the physiological sequence (*libido/intake/food/filling up*) oriented towards *living*, and the human way of socializing this intake in *meals* needs little comment.

The basic structure of this representation can be accounted for by the first fold of our model, which states that representation can emerge spontaneously from association of cognems that actualize as a pattern in the field of attention. It seems here that the pattern could have been

built by repeated chaining of couples of states which usually occur in a sequence : libido/intake, intake/food/ intake/filling up, intake/meal, food/meal. The link between *living* and the rest seems to be a mental reconstruction.

Considering this pattern, we note that natural social representations, at the level at which we study them, seem to connect together objects (the nuclei) larger than elemental cognems. In fact, each of those cognems/nuclei is a representation in itself. Each nucleus connects into a network a large set of more or less similar elements, something like a paradigm. As an illustration, here are (translated from French) some of the numerous words that were clustered by our software as typical elements of the nucleus « food » : *food, feed, bread, nourishment, diet, sustenance, supply, milk, dietetic, element, meat, nutri (-tion, -ent), breast, sour, sweet, cake, soup, vegetable, product, water, beverage, fresh, animal, fruit, lean, egg...*

Whether the *connections* that emerge from the verbal material were constructed independently by each individual is doubtful. These connections exist in the culture, materialized by the very structure of the semantic network common to all speakers. This can be proved by an analysis with the same method on a corpus of about 1,4 Megaoctets obtained by concatenating some 540 definitions of the term « to eat » and its synonyms or associates, and synonyms of its synonyms, as yielded by an analogical dictionary, Le Grand Robert (Lahlou, 1995). In this investigation, the dictionary is considered as a typical representative of culture, submitted to a free association protocol similar to the one applied to human subjects. We obtained the same structure of the social representation, although richer and more fine-grained than live Humans' because of the didactic style of the dictionary and its large vocabulary, which exceeds by far the lexicon of the layman.

The fact that both sources (dictionary and subjects) yield similar patterns of social representation, strengthens the social representation theory. But it also shows what a complex hen-and-egg problem the study of representation propagation has to face. For no human is born in a desert, and the very communication tools he uses, to build up and to express his representations, already contain implicitly some pattern.

Detailed analysis of the structure yielded by the dictionary showed that some nuclei contained elements whose presence can only be explained by a long term hysteresis, tracing back centuries, and in some cases probably much more. For example, remains of the Hippocratic philosophy are still present in the associations observed (Lahlou, 1994). So, when investigating and « old » representation (unlike what Moscovici could do with psychoanalysis, for example) we must be aware that it may carry in its structure traces of a long history that has been embedded in the language, and in the very elements the representation is made of : nothing is ever fully new, and representations are made of recycled, recombined, pre-existing representations.

6.2. Context is also what representations are made of

On this same topic of eating behavior, we tried to understand how circulation of information in the media would reflect or modify the representations. Therefore, we collected nearly 300 articles published in the press (daily newspapers, and newsmagazines) about the topic during

a period of three years, and submitted them to content analysis with the same statistical method described in the last section (Lahlou, 1996).

It is interesting to note that the structure obtained is different from the one obtained on the human subjects and dictionary. Two of the seven « classes » (it would not be correct to speak of « nuclei », since the data collection method, very different from free association, is not designed to obtain a representation pattern but rather a collection of topics) obtained are similar to the *food* and *meal* nuclei already described. The five others enlighten the stakes behind the production of information and representation, and are instructive because they stress the game of actors that constitute the context. Two classes are about the macroeconomic determinants of the food sector ; one presenting the evolution of industrial offer world-wide, the other the innovation of French firms. This traces the information flux by which actors and institutions try to inform, and influence, others ; by lobbying or trying to impose their conceptual framework, e.g. on European market politics.

Three other classes describe aspects of food consumption in the population. One, centered on the nutritional aspects, contains a medical discourse, with repressive tones, insisting on risks and prescriptions (e.g. : do not eat cholesterol). Another, describing consumer behavior, diffuses results of market studies and describes the tendencies of the French market. The legitimating effect, as evidenced by the frequency of experts' quotations, is important in this discourse that contributes to creating a representation of what the French consumer wants, in the minds of producers and retailers. The last class describes cultural aspects of the eating behavior. It is interesting to note that, as detailed analysis shows, the primary sources of the information are very few. For example, the last class has been constructed mainly by quotations or interviews and comments of the work of a single researcher who had just published a (successful) book on food sociology !

The discourses circulating in a public space, of which those articles are a trace, contribute to influence the various populations which are their targets. Quantitative measurement of this influence is an impossible challenge, since it is difficult to separate their influence from other factors. But many clues tend to prove influence in the long run. For instance, the persistent core of the dietetics discourse (*eating varied and balanced*) can now be found as a dominant trait in the free associations of French subjects on « eating well ». This core replaces *repletion*, which used to be the major trait of the representation, according to qualitative studies conducted in the 1950's, and which now remains salient only among rural populations.

More interesting than the potential influence of these discourses is the vast system of reciprocal influences they reveal, giving more flesh to a social constructionist model, and enlightening in a new way the notions of *anchoring* and *objectivation* introduced by Moscovici in his seminal work.

6.3. The co-construction of material reality and representations

A human society needs, as we have stated in the beginning of this article, a common reality. From the standpoint of the individual, sharing this set of representations is necessary to

survive in a complex environment. In this respect, representations are an encyclopedia of the world, that can be activated into action scripts, a kind of « user's manual » of the social reality, that every participant must know. So each actor knows how to play his part (Goffmann, 1973). But, from an aerial view, this set of representations also appears as a *master plan* for labor division, enabling social co-operation on a large scale : each individual, having his own version of the master plan, can play his own part.

What the (too short) evocation of the various pieces of information that actors exchange through communication media teaches us is that there is a continuous effort of global and decentralized negotiation, by which actors (individuals, firms, institutions etc..) try to know what others do and want, on one hand, and try to influence the others by getting them to share their views. In this continuous process, each actor brings into the common field of public representation the product of his activity : new combinations of representations (e.g. : medical or sociological knowledge on eating behavior), or new artifacts (e.g. : food products). All those objects, material or immaterial, are symbolically processed in a common U-language (of which the media articles studied are only a part : buying acts, for example, are another, which appears through market statistics). In the great hen-and-egg process that follows, each actor modifies his representations and activities. For example, consumers will look for low-fat products, and firms will design, produce, and retail such foods, which in turn will modify the foraging environment of the consumer, modify his practice and anchor them in reality. So, reality is indeed collectively co-constructed, and representations are a medium in this co-construction since they contribute to design action in the material. Anchoring, objectivation, can then be seen as different ways of describing a single feed-back mechanism : representations are constructed by anchoring in reality, and reality is constructed by turning representations into artifacts (the reason why firms will design low-fat foods is because their marketing services have a representation of the consumer as someone who will buy low-fat foods).

Reality contains patterns of elements that representations are made of (e.g. : « food »). It is so because, as we saw, reality propagates its own structures into the structures of social representation. On the other hand, representations contain patterns of elements of which reality is made of, because, as we just suggested, through the behavior of actors representation gets materialized into artifacts (e.g. : food products). It seems that reality and social representations contain the same patterns, more or less. In this « more or less », constituted of the difference between individual representation and social representation, and of the mutations and translation errors that occur in the process of pattern propagation, probably lies the key of a dialectic evolutionary process. In this process, the same objects successively play the role of pattern in a context, or part of the context.

7. An evolutionist perspective

The finality, if there is any, of the representation system, and of our socially constructed reality, is to provide that society can continue existing, collectively and as a set of individuals. In this respect, representations are a means to propagate the patterns of reality (the common context) so that every part of this complex system can adapt to the context. The immaterial nature of representations facilitates this dissemination at low costs and fast speed. It allows

adaptation to be done in the field of U-languages, by « thought experiments ». E.g. to test what concept of food I, as a manufacturer, should design, it is less costly to compare the representation of the food to the representation of the consumer. Representations allow planning action. They also allow capitalizing experience of others. By all these features, representations allow a faster and more economical evolution and co-ordination of the global society. What *social* representations bring is a collective negotiation and cross-validation. The cross-validation ensures that the mental representations that individuals manipulate are indeed representative of the global context in which action will take place. Conformity of individual representation to the social representation tends to guarantee its ecological validity as a good representative of « reality » -the collective context.

As we suggested, this adaptation of the social representation to the context comes from its nature as a « species » constituted of a population of individual representations hosted by the human population. By constant mutation at the individual level, and fast propagation of the adapted mutants, this population of representations is more likely, at every moment, to be mostly constituted of representatives that have a good fitness, that is are efficient models of what they stand for. For example, a fit representation of « a good food product » will be a model of what consumers, producers, medical institutions etc. want for their own purposes (satisfaction, profitability, health, etc.). This fitness is a result of the global negotiation between actors like the one we have evoked taking place through the market and the media. It is a global fitness for the whole society, since it is a compromise between all actors.

To conclude, we propose to consider social representations as domestic species, and as an evolutionary tool at the scale of human societies. This tool is twofold : at the individual level, it enables the actor to survive in his environment. At the collective level, it enables co-operation and labor division. We suggest that the replication process by which representations propagate is a crucial key to the co-construction of a coherent, and collectively negotiated, social reality.

Notes

(1) The method aims at spotting the basic nuclei of social representation, in the discourse produced by an informed source. First, a corpus of statements (sentences in natural language), about the same object (here : "eating") is obtained through the free association technique. The sentences obtained are aggregated into a single corpus. The corpus is processed with a statistical analysis of lexical data software, ALCESTE (Reinert, 1987, 1993), that yields classes of statements that have similar lexical content.

Those semantic classes are considered to be the basic nuclei of the social representation. This method is a kind of quantified, detailed, content analysis. Technically, classes are built on the principle of putting together statements that are close to each other within a cluster (analogy) and different from statements in other clusters (contrast). Analogy and contrast are made on the bases of significant traits. In our case, the traits will be lexical (lemmatized or stemmatized words), and the mathematical technique used is descending classification ("segmentation").

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