RETHINKING THE RELATION BETWEEN SCIENCE AND COMMON SENSE: A COMMENT ON THE CURRENT STATE OF SR THEORY

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Abstract: The relationship between common sense and scientific theory as conceptualized by SR theory is discussed. Two aspects of the theory of social representations (SR theory) are reconstructed in order to introduce the discussion: the notions of consensual vs. reified universes, and the concept of the influence of science on common sense. SR theory has undergone a phase of intense development in the last few years. It is shown that in the light of this, the above aspects need to be reexamined. The main part of the article then concentrates on the different aspects of science and scientific representation and tries to show that the boundaries between science and nonscience, i.e. common sense, are more complex than it seems. In particular, science and common sense do not entirely correspond to the reified and consensual universes respectively. Other points discussed include the operation of SR within science (not only between science and the public), functional and structural similarities between scientific theory and common sense, and influence of common sense on the elaboration of scientific theory. To conclude, a certain readaptation of SR theory is necessary, and potential benefits of this are discussed.

This paper is concerned with the discussion of an aspect of the theory of social representations (SR), namely the question of how the theory conceives of the relationship between common sense and science.

Historically, it has always been part of the ideology of science to view itself as opposed to the naive understanding of the man in the street. The contention that folk knowledge constitutes a distortion of truth, and that a strict intellectual discipline is needed to correct this distortion can be found in a multitude of forms in Western scholarly discourse from Plato onwards, and is arguably one of the central tenets of science still

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today: in the modern philosophy of mind, for example, several radically materialistic philosophers (so-called eliminativists, see for example P. S. Churchland, 1986) hold that the history of science is not much more than the progressive correction or elimination of erroneous folk theories by their more appropriate scientific counterparts.

A possible interpretation of social representation (SR) theory would be to consider it as opposed to this somewhat disparaging attitude towards common sense. Indeed, SR theory is historically an expansion on Moscovici's (1961) monograph on the diffusion of psychoanalytic theory throughout French society. The author more recently (1987, p. 513) has affirmed that "...any science devoted to the study of thoughts and beliefs in the society of our times must come to terms with an obvious epistemological problem: the relationship between scientific and non-scientific thought". In another publication (1992), he identifies social psychology as the only science whose vocation is the study of the construction and diffusion of everyday knowledge.

The anthropologist approaches societies other than his or her own, in order to gain an understanding of the way their members go about their day-to-day business. Likewise, the interest of social psychology for the everyday life of the man in the street makes it into the "anthropology of modern society" (Moscovici, 1987, p. 514). Such an endeavour requires a certain critical distance, however. As an alien to the culture he is studying, the anthropologist has less problems with this than the social psychologist, who cannot escape the fact of his belonging to his own culture. This has been discussed by Wagner (1990, 1994): the closer that one (conceptually) is to one's object of study (i.e. the more that one knows it tacitly), the more difficult it is to view it with critical distance.

The idea that scientific observation of one's own culture requires a simultaneous consideration of what also holds as nonscience, i.e. common sense, is rather recent.Wagner (1994) sees such a preoccupation as being characteristic of a "postmodernist" trend in science in general and social psychology in particular, because it is linked to discussion concerning the limits of scientific knowledge. At the same time, the traditionally negative connotation of folk knowledge is reversed and the creative aspect of such productions are emphasized. The author proposes, as a prelude to his exhaustive presentation of research on SR theory, a discussion intended to define more precisely the notion of "Alltag", which he defines as follows: "… die Sphäre des natürlichen, spontanen, mehr oder weniger unreflektierten Erlebens und Denkens ..., das sich auf den Ereignisbereich des täglichen Lebens bezieht und die kognitive und affektive Grundlage der Alltagsroutine bildet" (p. 51-52).

Such a definition simultaneously characterizes its own opposite, which is "die Sphäre des reflektierten, künstlichen, unspontanen, inbesondere wissenschaftlichen Erlebens und Denkens, die sich nicht in den alltäglichen Bereichen der Mehrheit der Menschen, sondern in für die Mehrheit exklusiven Bereichen, wie zum Beispiel in der Wissenschaft, in Leitungsetagen wirtschaftlicher Einheiten oder in höheren politischen Leitungsgremien realisiert" (p. 52).

It follows from such considerations that the essential aspect of "common sense" is precisely its commonness, i.e. its ubiquity. Common sense or common knowledge is, unlike expert or specialist knowledge, a capital available to all, and this forms the basis of its self-evidence. However, one may ask if there really exists any knowledge that is common to all human beings. Depending on how the term is understood, it is probably possible to find some such level of representation shared by all (see for example Fletcher,

1984), but the fact remains that the large part of what we understand by common sense is actually common to only a certain subset of "all people". Thus common sense would probably be better defined as what is common to all members of a certain culture, the word culture being understood in a nonspecific sense, i.e. one could for example conceive of the set of common knowledge of a small group.

Wagner (1993) defines epirationality as a kind of "socialized rationality", i.e. acting in accord with a system of collective beliefs. Epirationality thus is something more than "cold" rationality (which Wagner summarizes (p. 237) as "consistency according to some criterion", usually internal consistency). The concept is designed to capture the epistemological status of SR: insofar as SR specify what to look for, what to react to and how to react (see p. 245, as well as Moscovici, 1984, p. 62) in a given situation, they define what constitutes the "right" thing to do for a member of a group facing the above situation. Acting according to this norm is expected, and the actor doing so would be hard put to explain why: such behavior is self-evident. It is the actor who deviates from this expected behavior (acting irrationally)who may be called upon to justify himself, and he will usually do so by appealing to the very set of beliefs his behavior apparently neglected.

Common sense, enjoying an epistemological status of epirationality, is therefore eminently culture-specific. It should now be clear that there is a caveat to imposed on the apparent ubiquity of common sense: it is the knowledge shared by all members of a given group. The fact that most discussions of folk theory implicitly focus on knowledge self-evident to members of our own modern-day western culture tends to obscure this (rather obvious) insight.

Within the framework of a theory of multi-level social self-organization, von Cranach (1992) has formulated the following general principle: "Knowledge comes into existence in the history of self-active systems; it serves their adaptation and survival. Therefore, any self-active system must be in possession of knowledge, and any knowledge is bound to a self-active carrier-system" (p. 11). The term "self-active system" designates a subclass of living systems in general that "steer and energize their activity out of themselves" (p. 11). Besides providing us with another way of expressing cultural relativity of knowledge in a large-scale, systematic framework, such a statement also hints toward a general action-related function of knowledge, what Wagner (1994, p. 100) calls the "action imperative", with which the Alltagsmensch is confronted.

We have come this far: departing from the conception that common sense and science are mutually and irreconciliably opposed, we have come to the conclusion, after a closer examination of the notion of common sense, that such a notion is culture- or group-specific. We will now analyze the relation between common sense and science as conceptualized in SR theory. In several publications, Moscovici (1981, 1984, 1987, 1988, 1992) repeatedly opposes the "worlds" of SR and science, and in doing so, apparently perpetuates the ideology opposing science and common sense. This opposition may have been justified at some earlier state of development of SR theory, but I will try to argue later that in light of the current state of the theory, it should be reexamined.

Consensual and reified universes

To understand the nature of the distinction between common sense and science, it is necessary to examine Moscovici's discussion of the consensual and reified universes of knowledge, for the definition and mutual opposition of common sense and science is grafted onto them: the consensual universe corresponds to the world of SR, whereas the reified universe corresponds to the world of science.

We may start by quoting Moscovici on the notion of a consensual universe: "… society views itself as a group made up of individuals who are of equal worth and irreducible. From this perspective, each individual is free to behave as an 'amateur' and curious 'observer' .... Most places where people congregate overflow with amateurs of this sort, men interested in politics, medecine, education, etc. who voice their opinions, present their theories and have an answer to all problems. These universes have been institutionalized as clubs, associations, cafés, etc. where the vanishing art of conversation serves as a paradigm.... Thought itself is acted out aloud, in a noisy and public display which fulfills the need to communicate. In his play Endgame, Beckett neatly sums up the situation (1981, p. 186-187):

CLOV: What is there to keep me here?
HAMM: The dialogue."

It is easy to see that the emphasis here (and at the same time the defining characteristic of the consensual universe) is on the notion of conversation, ongoing, incessant, conversation between a multitude of speakers for whom talk is cheap and nothing is sacred. This distinction between sacred and profane knowledge has elsewhere been acknowledged by Moscovici to be analogous, indeed, to be a historical predecessor of the distinction between consensual and reified universes.

Formerly, according to Moscovici (1984, p. 20), the distinction was "between a sacred sphere - worthy of respect and veneration and so kept apart from all purposeful, human, activities - and a profane sphere in which trivial, utilitarian activities were performed... This distinction has now been abandoned. It has been replaced by another, more basic, distinction between consensual and reified universes". The sacred sphere in traditional society was one of mystery and taboo, and generated its own defenses against loose or offhand talk: ritual, ceremony, in short, highly formalized communication.This characteristic of formalization has the effect of stabilizing meaning. In this fashion, talk about the sacred/reified becomes independent of the speaker, who is only the vessel, the vehicle of the content: in the sacred (or reified) universe, "things thus become the measure of man" (Moscovici, 1981, p. 186).

The relation of such questions to those of definition or interpretation is also readily evident here. Religious orthodoxy, political ideology, "hard" scientific theory, all of these bodies of knowledge impose an unequivocal understanding of the concepts they contain on their users. The emphasis is on the strict dennotation of a term, rather than on possible connotations. There are not several possible interpretations, rather, there is only one possible meaning of a concept. An example of such a universe of knowledge can be found in von Cranach (1992, p. 19), and concerns the "...oral tradition of religious and philosophical thought in Ancient India (between 750 and 350 B.C.), ideas which were so sacred and secret they could not be written down. In the Braman-Schools, students learned these texts by heart in up to 12 years of study and passed them on from

generation to generation, for about 1000 years. Specific systems of memory training were developed, and the constant change of colloquial language, a threat to the mystical quality of the texts , provoked the development of a scientific grammmar and phonetics system, as a kind of meta-memories for the text (Rüstau 1988 p. 16-17)" (added italics).

We also have here a principle which allows us to characterize the operation of connotation, namely: the study of which word complexes are associated with which labels, or in other words, what are the different semantic networks associated with a given word or words. One could also ask, what ideas does a given label "trigger"? Which words belong together in the shared mental life of a group? And one could say that this is why the study of SR is the study of meaning, since the meaning of a word is not exactly the frozen meaning that is given in a dictionary, but calls upon central ideas of common experience stored in the collective memory of a certain group, ideas which are more often than not highly imagistic, but which correspond to particular sets of words, phrases, and expressions.

The dichotomy between consensual and reified universes may therefore be summarized along the following dimensions:

Contrasts between consensual and reified categories of knowledge

TABLE 1

consensual	reified
profane	sacred
exoteric	esoteric
common sense	science
no formalization	formalization
polysemic definition	strict definition
connotation	dennotation
dependence of knowledge on carrier system	alleged independence of knowledge from carrier system
low stability over time	high stability over time

It is in this incessant babble of society, in the "waning art of conversation" that Moscovici sees the motor of the creation and change of SR. It is through communication that unfamiliar contents are anchored into the existing network of representations and areobjectified (1981, 1984).

What kind of knowledge readily circulates among society? Moscovici's proposed function for SR is the following: transforming what is unfamiliar into something familiar. SR help us to conceive of novelty in a less threatening fashion, they allow us to transfer "...what disturbs us, what threatens our universe, from the outside to the inside, from far off to near by. The transfer is effected by separating normally linked concepts and perceptions and setting them in a context where the unusual becomes usual, where the unknown can be included in an acknowledged category" (1984, p. 26). In other words, such a transfer consists of integrating them into the existing knowledge structure of the group.

The ideas that diffuse the most are the "hot" topics of society, and SR are therefore most apparent in times of social change (Moscovici, 1984). Such topics that have been studied within the SR paradigm include AIDS, gender differences, mental illness, etc.

Another source of novelty according to Moscovici, a sort of "unfamiliarity generator", is science. Moscovici even goes so far as to explicitly oppose science to SR insofar as the function of science is to "render the familiar unfamiliar" (1981), and maintains that the "basic tension between the familiar and the unfamiliar is resolved in our consensual universe, in favor of the former. That is why, in social thought, conclusions have primacy over premises and... the verdict rather than the trial determines our social relations.... Science offers a striking contrast to this process. It follows the inverse path, especially on the logical level, moving from premises to conclusions, as jurisprudence has the task of assuring the primacy of the trial over the verdict. This procedure goes so much against the grain of what human beings do spontaneously, that a solid apparatus of logic and proof must be marshalled, and rules of impersonality, repetition of experiments, distantiation from the object, independence in relation to authority and tradition imposed. Science creates a wholly artificial environment. Then, to counteract the tendency to to confirm the familiar, to verify what one already knows, … it requires scientists to falsify , to try to invalidate their own theories and to present counter-evidence to their evidence. Modern science, which has broken its ties with common sense, is successfully occupied with unceasingly destroying the bulk of our prevailing perceptions and ideas … In other words, the principle of science is to make the familiar unfamiliar… It demonstrates, a contrario , the justification for social representations to which I have just drawn your attention" (p. 190-191).

The preceding series of quotations show us how Moscovici consistently follows a logic of opposition in the construction of the consensual and reified universes, so that in the end, one is faced with a monolithic partitioning of human culture into two worlds so different that one wonders how they could ever coexist. But coexist they do, and their interaction is also a central theme in several other publications of his. It was mentioned above that one of the privileged sources of "food for thought" for SR is scientific theory. It seems that the attention of the general public, of the Alltagsmensch , is continuously riveted onto the ongoing productions of science that are diffused by the media, transforming them into social representations, accessible to and understandable by everyone. The popularization and mythification of scientific theory is thus elevated into a sort of one-sided influence of science on common sense. The dynamics of such an influence have been earmarked for special attention by Moscovici in several publications. In the next section, we will examine this problem.

THE VECTOR FROM SCIENCE TO COMMON SENSE

What happens when a scientific concept is appropriated by nonscientific understanding? Moscovici (1984) has a special interest in the emergence of social representations from scientific theory, and on the "metamorphosis of the latter within a society and the manner in which they renewed common sense" (p. 57). According to him, such emergence is a "change from one intellectual and social level to another". Further on, we find the affirmation that "common sense is continually being created in our societies, especially where scientific and technical knowledge is popularised .... That which, in the long run, acquires the validity of something our senses or our understanding perceive directly always turns out to be the secondary, modified product of scientific research. In other words, common sense no longer circulates from below to on

high, but from on high to below; it is no longer the point of departure but the point of arrival. The continuity which philosophers stipulate between common sense and science is still there but it is not what it used to be" (p. 57).

Further on, the evolution from science to ideology can be seen as following three phases: (a) the scientific phase of its elaboration from a theory by a scientific discipline (economics, biology, etc.); (b) the representative phase in which it diffuses within a society and its images, concepts, and vocabulary are recast and adapted; (c) the ideological phase in which the representation is appropriated by a party, a school of thought, or an organ of state and is logically reconstructed so that a product, created by society as a whole, can be enforced in the name of science" (p. 58). Arguments from another source that the process of "sciencing" is diametrically opposed to that of ideologization can be found in Doise (1982), who rejects the possibility that experimentation in social psychology is a vehicle of ideology: "Pour ce qui est de l'éventuel rôle idéologique de la pratique expérimentale: tout comme l'expérimentation ne se déroule pas dans un vide sociologique, l'activité scientifique des psychosociologues ne se pratique pas dans un vide idéologique. Au contraire, elle doit consister à mettre continuellement en question les vérités toutes faites de l'idéologie, à dévoiler leurs déterminations et leur fonctionnement.... L'expérimentation devient alors démystificatrice; elle vérifie comment les caractéristiques considérées comme universelles et inscrites dans la nature des groupes et des personnes, ne sont en fait que l'expression de certains rapports existant entre ces groupes et personnes et qu'elles changent avec l'évolution de ces rapports" (p. 155).

Moscovici's interest for the process of transition between science and common sense becomes much more focused in two publications (1992, 1993a), in which he introduces the term "scientific myth" as a characterization of a specific class of SR whose function is the appropriation of the content of scientific theories and their transformation into a form "digestible" by the general public. Let us quote: "We live, and this has to be declared aloud, in a world where myths are overabundant and freely proliferate.... Their number has reached such a puzzling eminence as one would judge the thing to be sheer impossibility. I am speaking of scientific myths. Three or four recent examples of the universe, e. g. viruses, left and right brains, the Big Bang, the death of the universe, have combined to make more striking the manifestations of the problem under investigation" (p. 3).

The very notion of a scientific myth is apparently strange, like that of "... a round square or an atheistic religion" ... we like to relegate myths into the past. We boast that they have been eliminated by science. ... One is led to conceive scientific myths as a deviation from knowledge, and even a pathology of thought by either default or excess" (p. 3).

There is a certain emphasis on the fact that scientific myths often have a bad reputation. They are seen, as above quoted, as a pathology, or a deviation. Why is this? Moscovici gives two reasons. First, such thinking is promiscuous, mixing itself, knowing no bounds of validity. One may apply a theory originally developed in a strictly defined context to any apparently suitable object. Second, scientific myths are entirely self-sufficient, ("logically complete", in the author's words), that is, they can explain everything one fancies to apply them to.

Another important point emphasized by the author is the fact that such myths are not being, as they should, eliminated by scientific progress. In fact, they seem to have never had it so good. Such an apparent paradox can be explained by the fact that "science resumes underhand the inveterate distinction between esoteric and exoteric knowledge. Its location is on the side of the former class of knowledge which, according to Bacon, is presented in a puzzling fashion, taught to those who are qualified for it and understood only by a small number of people" (p. 4). Further on, we see that "this demarcation states an interdict of knowing ". It is here that we see the function of scientific myths. They allow one to transgress the interdict, to produce exoteric knowledge, that can be grasped by all.

The popularizers of science are thus the "myth-makers of modern times", whose transgression launches a process of creation of profane knowledge from what was originally a concept elaborated in the midst of a small group of researchers: thus uprooted from its original context, the concept is appropriated by the different media, and thrown around, discussed, amplified, acclaimed, distorted, disproved, discredited, forgotten, and rediscovered, circulating in the process among all conceivable factions of society, serving each and every one in turn.

RETHINKING THE RELATION BETWEEN SCIENCE AND SR

The purpose of the last two sections was to reconstruct two central (and interrelated) themes in the work of Moscovici on SR, namely (1) the depiction of SR and science as belonging to two radically different classes of knowledge, and (2) the depiction of the first class as largely subject to the influence of the second. As mentioned above, the purpose of this reconstruction is criticism, but first a cautionary note is in order.

I am not questioning the validity of the time-honored distinction between consensual and reified categories of knowledge, nor do I have any problems with the influence of science on the popular imagination. It is clear that Moscovici has identified a wealth of thoroughly interesting and important phenomena for study. What I am questioning is the application of the distinction to qualify and (in my opinion) overaccentuate the opposition of science and everyday knowledge. In other words, one suspects that the two distinctions (consensual vs. reified knowledge and science vs. common sense) do not correspond entirely.

REEXAMINING A DICHOTOMY

Most examples of dichotomization in the history of the human sciences (consider for example the distinctions between mind and body, or between the individual and society) correspond to phenomenological evidence, i.e. they reflect reality as it immediately appears to us. Such distinctions often constitute a nice way of roughly organizing facts the nature of which one is largely ignorant, in order to set a research program in movement. However, they also have a not-so-nice way of hanging around long after they have outlived their usefulness, becoming fossilized in the process. Such is the case of the mind-body duality, a metaphysical tar pit the reality of which Descartes could not doubt, and the confusion engendered by which we are still mired in today (see for example Dennett, 1991).

Likewise, in the infancy of SR research, as well as throughout a certain period of its development, it may have been necessary to conceptually differentiate social psychology as a science in a rather radical fashion from its object of study (namely, SR), this in the interest of attaining some measure of objectivity. The lack of epistemic distance endemic to a social psychology that takes folk knowledge as its object of study has been discussed by Wagner (1990, 1994). Therefore, given the initial state of affairs in this domain of research, a rather strict separation of phenomena might have been justified. As matter of fact, the current entity that is SR theory evolved from a large part out of Moscovici's now canonical (1961) study on the diffusion of psychoanalysis throughout French society. However, things have changed since then, as the explosive development of SR theory in the recent years has shown (Farr, 1987; Moscovici, 1993b). From a system-theoretical viewpoint, development always implies restructuration, usually in a direction of increased complexity, and it is therefore inevitable that certain obsolete parts of a system be readapted. I am arguing that the present state of the system that is SR theory requires a reexamination of the assumption that SR and science neatly correspond to two disjunct classes of knowledge, as well as a reexamination of the nature of these two categories.

Let me express this in another fashion. From a constructivistic perspective (Bruner, 1990; Varela, Thompson, & Rosch 1991), phenomenal[1] categories of conscious experience (in our case, the categories "science" and "common sense") are aggregates, i.e. conscious perception is a syncretic process, that fuses together and transforms isolated events, thereby constructing the perceived phenomenon. Such categories are defined prototypically rather than formally (Rosch, 1978; Schwarz & Reisberg 1991), which means in our context that (1) they are multidimensional and opposition of such categories must contain the specification of which dimension is used as a discriminator, because some dimensions do not discriminate, and thus (2) their boundaries are fuzzy, and may dissolve upon adoption of a smaller scale of observation.

Our problem is what to do with the two categories of "science" and "common sense". In the preceding sections, a number of dimensions were abstracted along which the constrast between these categories was clear. However, according to (1) and (2) above, such a constrast may be reduced or disappear when other aspects are taken into account: the challenge here is to explore these "shadowlands", to see when the boundaries between scientific and everyday understanding blur and smudge.

KNOWLEDGE AND KNOWLEDGE-CARRYING SYSTEMS

Having clarified my intentions, I would like to demonstrate how such an exploration could be conceived. For this, I briefly reinvoke the maxim, discussed above, that knowledge is not dissociable from its carrier-system. In particular, we have seen that the concept of common sense, having an epirational epistemological status (Wagner, 1993), is eminently culture-specific. Every group that has existed for a certain amount of time develops its own Alltagswissen. Likewise, what is common knowledge for one group may not be so for an other. Thus, the distinction between common knowledge and restricted knowledge (related to the attribution of expert and lay status) is a relative one: inside a given culture, there are many subcultures, and a subculture or subgroup which is

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[1] Let us use the term in the wide sense of "what is given to us": not only perceptively, but also cognitively.

an expert in relation to another group concerning a certain theme may simultaneously be considered a nonexpert in relation to another subgroup concerning the same theme. Von Cranach (1992, 1995) has proposed a general system-theoretical framework in which one may conceptualize the action of social systems. An essential aspect of this theory is the concept of multi-level organization: description of social systems must take into account the qualitative differences between their different levels of organization. In particular, von Cranach (1992) (re-)defines a SR as the knowledge particular to a social system or a part of it. This knowledge arises in the history of the social system (its carrier-system) and the meaning of the knowledge can only be understood in relation to other aspects of the carrier-system (its history, goals, structure, etc.).

I would like to use this theory as a general guideline for the rest of my argumentation, the point of which is, as stated above, to discuss the possibility and the potential benefits of a more differentiated view of the categories of science and common sense and of their relation.

Flick (1995) has proposed a taxonomy of different categories of knowledge in western postindustrial society, including myth and religion, science, "pre-scientific" common sense, "post-scientific" Alltagswissen, and ideology. Here we can see that the simple dichotomy between "science" and "common sense", is but a part of a much more complex state of affairs. The author also postulates a transformative cycle of knowledge of which the relation between science and SR is also only a part. It is equally possible to insert Moscovici's (1984) 3-stage model of transformation from science to ideology in this cycle, and finally, Doise's (1982) comment on the role of science as a demystification of ideology also finds a place here. One should notice that in this model science is an integral part of this cycle of knowledge, and is thus also subject to the influence of different aspects of nonscientific knowledge. We will come back to this later, but first let us focus our attention specifically on the category of "science".

CONSENSUAL AND REIFIED ASPECTS OF SCIENCE

When speaking of science, one usually means scientific knowledge: through its much-acclaimed objectivity and methodical weeding out of subjective bias, scientific knowledge ostensibly stands on its own, i.e. its content is independent of the local idiosyncrasies of the particular group of scientists that produced it. In other words we have a dissociation of knowledge from its carrier-system: the content of the knowledge is independent of the process of its production. In this sense, the content of official scientific knowledge certainly does correspond to Moscovici's (1984) reified universe, or to Berger & Luckmann's (1966) discussion of objectification in the course of the construction of symbolic universes.

But there is of course another aspect to science.[2] One may point out that a more realistic designation of science is that of a complex social system or a collection of interacting systems rather than as a disembodied theoretical structure. This makes plain what is problematic with the opposition "science vs. common sense": first of all, "science" is not equivalent to "scientific knowledge", and second, the system of science is nothing like a homogenous group of like-minded researchers. One may even question, as does Feyerabend (1987), the fact that the category "science" corresponds to any unitary

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[2] I am grateful to W. Wagner for suggesting this distinction to me.

reality: "the events and results that constitute the sciences have no common structure; there are no elements that occur in every scientific investigation but are missing elsewhere (p. 281)". This insight seems all the more compelling when one reflects on the fragmentation of modern science or even social science (see Cooper, 1984). Scientific knowledge is no more homogenous than the knowledge stored in other social systems. The rampant specialization of scientists and the much bemoaned lack of unity, indeed of even a common vocabulary among scientists is a strong argument supporting this conclusion.

In other words, in the case of a system whose internal structure is as complex as the one we call "science", it seems important to consider informal processes of knowledge construction as well as the objectified knowledge product. That is, the theory that has passed all the criteria of scientificity is not the whole story but only the end result, just as falsification is not the whole story in the history of science, but is probably closer to being a myth (see again Feyerabend, 1987). The fact remains, however, that it is a constitutive part of the ideology of science to legitimate its product on the assumption that its method of construction (or discovery, as the case may be) is infallible. This is what Moscovici expresses when he writes that science corresponds to the reified universe of knowledge.

However, in what measure exactly does this view of things represent the reality of modern science? In the framework of his so-called "lay epistemics" theory, Kruglanski (1989) writes of an unofficial scientific methodology, which is derived from the "social nature of science" (p. 245). Before him, Lyotard (1979) has identified one the main characteristics of "the postmodern condition" as the fact that knowledge has become a commodity whose value, much like money, lies mainly in its circulation. One could speculate that scientific knowledge is also increasingly subject to this societal condition. Indeed, it is readily apparent in Lyotard's presentation that reflection on the condition of science is no more dissociable from reflection on society in general. If this is so, then, simplifying things to the point of caricature, one could say that informally circulating rough drafts, e-mail, dialogue, and not immutable laws constitute the important aspects of modern science: if the science of yesterday was exemplified by the 20-volume treatise, then the science of today is exemplified by the e-mail bulletin. This is probably a bit excessive, but I maintain that it does correspond to some reality. Examples of this are not difficult to find: the editorial of a recent edition of the Papers on Social Representations ("What's in a discussion?" vol. 3, 1994) explicitly exhorts would-be contributors to tailor their papers to more informal aspects and deemphasize the habitual methodological criteria that are usually applied for the selection of candidates for publication.

In other words, when science is taken by social psychologists as an object of study, it must be recognized that there are not one, but many sciences, and within each discipline we find subdisciplines and specializations, right on down to the specific schools of thought, which are small groups like any other, with their traditions, history, etc. Moreover, such differentiation is also integrated and instituted in a hierarchy which intersects with organizations of higher education and with political organisms, as well as with industry and commerce. The material objects which form the day-to-day environment of scientific activity (computers, video cameras, particle accelerators, and whatnot), as well as the communicative media that holds the different groups together (journals, congresses, e-mail, committees, coffee-room discussions, the Internet) must

also be taken into account. Suddenly the environment in which scientific knowledge is elaborated does not seem so sterile and negligible, and it seems that highly systematic theoretical systems are but a small part of the large diversity of scientific representation.

Having stated my arguments against a purely reified conception of science, I would like to argue in favor of a certain similarity between scientific theory and nonscientific thought. I will proceed on two levels, first functionally and then structurally.

FUNCTIONAL SIMILARITIES BETWEEN SCIENTIFIC AND NONSCIENTIFIC REPRESENTATION

Scientific groups are submitted to similar ecological pressures as those of nonscientists. I hope to have made it clear above that if we pursue in a strict manner the maxim that SR operate where knowledge circulates freely between different subgroups of a culture, then it seems trivial to assume that SR do not only function at the interface between science and the general public, but also within science. This is mainly because of the highly uneven distribution of expertise (and status!) in the sciences. Some scientists can be laypersons for other scientists: a psychologist is a layman in relation to a biological question, etc. One could even say that a social psychologist is a layman in relation to another social psychologist, given a particular problem. That is, each of the individual sciences and subdisciplines has its own body of insider knowledge and implicit theory which forms the context in which their official theories are elaborated and exported towards other scientific groups. How do other scientists grasp the meaning of such communications as a function of their own concerns and interests? It seems evident that here, too, that which Moscovici calls the "dynamics of representation" intervene as outsiders to the group comprehend knowledge in relation to their own research context. There must be some simplification of content involved in the process, some reinterpretation.

A classical reading of some of the now canonical elements of SR theory argues in favor of science and common sense as being functionally opposed: Moscovici (1984) assigns to SR the function of "rendering familiar the unfamiliar" (p. 24), whereas science supposedly does exactly the opposite. As we have seen above that what is familiar for one culture might be unfamiliar for the other, it follows when speaking of unfamiliarity and familiarity, it should always be clear in relation to which system of knowledge the affirmation is made.

Moscovici implicitly considers both the world of science and that of everyday understanding from the viewpoint of the non-scientist: this is why science allegedly renders the familar unfamiliar, and SR the unfamiliar familiar. For the naive observer, science transforms the familiar world of everyday life into a bewildering world of bizarre concepts and incomprehensible equations, dissolving even the apparent solidity of surrounding material objects into a lot of whirling, spinning, invisible particles. Science is unintelligible for the layman, and must be transformed by being integrated into his pre-existing scheme of things before it can be understood. Thus does common sense invert the process and render the unfamiliar familiar. But one could argue that the scientist who views common sense through the filter of theory, it is precisely this world of common sense that is unfamiliar.

Therefore, if it is true that in the eyes of the naive subject, science consists in rendering problematic what is self-evident, it is however also true that the language of common sense is also strange to the on-duty scientist, because it cannot be processed as it is, but rather must be transformed first. An example: the classical model of explanation in science is the so-called deductive-nomological model (or the covering-law model, see Hempel 1963). This model conceptualizes explanation as subsumption (Manicas & Secord, 1983): given a general law and a set of specific conditions, the phenomenon in question may be explained. In this manner, explaining a phenomenon involves considering it as a special case of the more general law, i.e. somewhat akin to a categorization. So it is true that the unfamiliar (the naked, unique phenomenon) is explained in the light of what is familiar and long-established (the covering law). Thus the vector of transformation from the unfamiliar to the familiar apparently applies equally well to scientific as well as lay understanding, once we assume that "familiarity" is culture-specific (similar conclusions can be found in von Cranach, 1995).

How exactly could this functional similarity be expressed? Wagner et al. (1994) have studied the role of metaphor in everyday understanding. Basing their conclusions on the particular case of metaphors of conception, they relate their research to that of Sperber (1985), who himself proposes the metaphor of an epidemic to model the diffusion of representations through society. The factors cited by the authors that purportedly influence the "contagiousness" of a specific representation are (a) "appeal to a qualified majority of the target population", and (b) whether the metaphor "captures the essentials of the new idea" (p. 5). Speculating along these lines, one may therefore surmise that similar processes take place in the diffusion of knowledge inside the scientific community, since neither of the elements quoted above give us reason to suppose the contrary.

One could thus hypothesize that the part of a theory that travels the farthest through the scientific community is its metaphorical nucleus. One has only to look at a few examples in the (recent and not-so-recent) history of science to get an intuitive feel for this hypothesis: the persistence of atomism across several thousand years of debate, the diffusion (and dilution) of Kuhn's paradigm concept, and the current interdisciplinary enthusiasm for chaos and dynamic system theory seem to me to be particularly revealing cases. Pertaining to this last example, Sommer (1995) has enunciated a few of the characteristics of the diffusion of chaos theory throughout society at large. It would be interesting to measure some of this diffusion throughout the scientific community, i.e. the social representations of chaos theory in the different sciences.

Recent publications by Moscovici (1992, 1993a, 1994) are closely concerned with this problem: the notion of themata (1992, 1994), is meant to capture this semantic persistence over time (see also Holton, 1973). In addition, Moscovici (1993b) focuses on the possible application of minority influence theory to the study of scientific change, which constitutes further support for the thesis of a functional similarity between scientific and nonscientific representation: an apparently essential feature of the history of science, the "faculty for a group to change a social handicap into a cognitive asset, thus ensuring its survival" (p. 371) is not of a nature that is intrinsically differentiating between science and nonscience.

STRUCTURAL SIMILARITIES BETWEEN SCIENTIFIC AND NONSCIENTIFIC REPRESENTATION

So much for the functional similarity of scientific and nonscientific social systems. Let me now hint at a structural resemblance between scientific theory and SR, a resemblance that has been suggested elsewhere: Moscovici (1993b) urges the reader to consider the idea that "theories, like beliefs of every kind, are representational", and that "scientific theories are best defined as representations, and not as systems of axioms and logical sentences (p. 350). He goes on to write that "inasmuch as they are public, produced and shared by a community, it is more exact to consider them as social representations" (p. 366). further on, he compares the central nucleus of a representation to Lakatos' concept of the core of a research program. For my part, I find it interesting that the philosopher of science Bachelard (1971) defined the frontiers of science as being "not so much a limit as a zone of particularly active thoughts, a domain of assimilation"[3] (p. 18), a formulation that is surprisingly close to Abric's (1993) and Flament's (1989) description of the periphery of a social representation and its protective function.

I hope to have given plausible, even if nonempirical evidence for the consideration of scientific and nonscientific representation as being (to a certain degree) functionally and structurally similar. I would like to use this conclusion in turn as a prelude to the argumentation of my last point: that of an essential continuity between scientific and nonscientific knowledge, a continuity in which science is as often on the receiving end of influence as it is not.

SOCIAL INFLUENCE AND SCIENTIFIC THEORY

Science is not watertight from the rest of society. There is, and always has been a percolation of influence from lay society to science, although it has received much less attention than the influence of science on lay society, which constitues the historical core of SR theory. This influence of lay society on science exists partly because science is not produced by machines, but practiced by human beings, for whom it is more and more a profession, and not a calling (Feyerabend, 1987). In a similar vein, Heijl (1991) identifies multiple membership in different social systems as an important factor of interaction (and therefore influence) between systems. A telling example of this is the fact, mentioned above, that scientific research is embedded to a large part in institutions of higher learning, i.e. science fulfills a pedagogical function in society as much as it fulfills a knowledge-producing function. It is even so that some of the most able students of science eventually become practitioners of science, bringing whatever baggage of prescientific culture they have with them. Some of it will have been transformed into scientifically acceptable practice and opinion, some will not. Thus does the germ of society subtly infiltrate the ivory tower of science (see Moscovici, 1993b for a more erudite presentation of generational change in science). The influence of the student minority on science can also be more brutal, as in the case of the student riots of 1968.

Again, metaphors seem to be especially effective vehicles of such exterior influence. A case in point is the consistent apparition of technological metaphors in the theorizing on the nature of the human mind: the history of the mind is replete with comparisons to

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[3] My translation.

hydraulic machinery, telephone switchboards, computers, and the like (see also Bruner & Fleisher Feldman, 1990).

A last example: the recent discussion provoked by Wagner's (1994) article on intentional explanation centers on the status of ordinary-language explanation in scientific psychology. These examples seem to justify having a closer look at the exact boundaries between science and nonscience.

ON THE POTENTIAL BENEFITS TO SR THEORY OF AN REVISITED CONCEPTION OF THE RELATION BETWEEN COMMON SENSE AND SCIENCE

This article started on a critical note. Maybe it would be better to finish on a more positive tone: let us speak of the potential benefits to SR theory of a more differentiated conception of the categories "science and "common sense" and their mutual relationship.

Commonsense is in vogue nowadays, and even though it has been so for a while, it has been especially so recently. Discussions exist on the topic in various disciplinary fields, even if interdisciplinarity is not particularly the case. For example, the related notion of folk psychology is one of the basic elements of the high-profile debates that take place among philosophers of mind (Stich, 1983; P. M. Churchland, 1984; P. S. Churchland, 1986; Greenwood, 1991). Another thing that is particularly noticeable about these debates is the extremely simplistic character of the notion of "folk psychology" upon which they are based (cf. Stich & Nichols 1992). Moscovici (1993b, p. 346) criticizes the unwarranted assumption that "commonsense has remained unaltered for two thousand years". One could also criticize these philosophers for tacitly assuming that the content of folk psychological theories is geographically or demographically homogenous, or that the question of their "elimination" (P. S. Churchland, 1986) can be discussed on a similar footing as that of scientific theories.

What I mean is this: there is a lot being said on commonsense these days, and not all of it is well-informed. The theory of social representations, which for the last thirty years has been empirically studying this theme, must come out as something of an expert in the field, and it would be a stimulating challenge to practitioners of SR theory to develop their views so as to assume this position.

This has been suggested before. Jost (1992, 1993) has proposed a set of hypotheses whose investigation would fall under the heading "social psychology of science". He is in this manner proposing a colonization of epistemology by a branch of science (SR theory). Moscovici (1993b) does the same, by proposing the application of minority influence theory to the study of the history of science. Elsewhere, von Cranach (1991, 1992) maintains that the hoary old philosophical free will problem can and should be subjected to scientific study. Indeed, certain aspects of the free will problem on a societal level involve SR of free will and freedom. Such appeals all have one thing in common: examining aspects of scientific knowledge without the presupposition that it is fundamentally different from other knowledge types. Only then will we be able to find out the real differences between science and common sense. We might even be surprised.

SR theory has been defined as aiming at a fundamental redefinition of the role of social psychology among the sciences: Moscovici writes for example that it is to be the anthropology of modern society. One might say that it has the potential to be an anthropology of postmodern society, especially of postmodern knowledge. But then it

must contain a detailed account of the relation of scientific knowledge to other categories of knowledge. Likewise, if we agree with Doise (1982) that the role of social psychology must be a questioning of ideology, we must also open it to the questioning of scientific ideology.

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