

SOCIAL REPRESENTATIONS AND THE PHILOSOPHY OF SCIENCE: BELIEF IN ONTOLOGICAL REALISM AS OBJECTIFICATION*

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Abstract: Work by Moscovici and colleagues on the theory of social representations has long been thought to be relevant for the philosophy and sociology of science, although few studies have actually explored the interdisciplinary relationship in any detail. It is argued here that the Moscovician concept of objectification bears striking similarity to the philosophy of science notion of ontological realism, and that the theory of social representations leads to the interesting but counterintuitive prediction that laypersons will be more likely than scientific experts to hold positions of ontological realism about scientific theories and entities. In an effort to apply the theory of social representations to issues of philosophy of science, six related hypotheses for the social psychology of scientific knowledge are offered.

A science of reality thus becomes a science in reality... at this stage its evolution becomes the affair of social psychology.¹ --Moscovici, 1961, p. 19

Though the strength of group commitment varies, with nontrivial consequences, along the spectrum from heuristic to ontological models, all models have similar functions. Among other things they supply the group with preferred or permissible analogies and metaphors. -- Kuhn, 1962, p. 184

While debates concerning philosophical and scientific realism have raged for many centuries, it is a relatively recent notion that ontological realism (e.g., the belief that self-esteem really exists, or that quarks are real) results, almost epiphenomenally, from a linguistic process of representation. The philosopher Ludwig Wittgenstein (1953, 1967, 1980) was perhaps among the first to emphasize the powerful role played by linguistic practices (or 'language-games') in the construction of reality. In the field of philosophical psychology, Wittgenstein argued that mental realism (the belief that thinking, for example, is a 'real' internal psychological process) emerges largely as a result of the grammar of our psychological concepts. In short, Wittgenstein claimed that our ways of speaking about the mind lead us to invent a world which contains mental entities and processes.

Moscovici & Hewstone (1983) make an almost identical, though more generic, point in their review of the social psychological notion of "social representations". They write that:

Representation has a propensity to make qualities and forces correspond to ideas or words -- stated baldly, to give ontological life to something that is no more than a logical, even verbal, 'being' (p. 112).

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¹ This passage is translated from the French by Farr (1984), p. 129.

In this brief paper, I shall argue that a fascinating and counter-intuitive empirical consequence of Moscovici's theory of social representations is that laypersons should be more likely to be ontological realists about the concepts and theories of a given scientific domain than the scientific experts themselves.

MOSCOVICI'S THEORY OF SOCIAL REPRESENTATIONS

In a number of books and articles spanning thirty years (e.g., Moscovici, 1961/1976, 1973, 1981, 1982, 1984, 1988; Moscovici & Hewstone, 1983; Farr & Moscovici, 1984), Moscovici and colleagues have sought to develop a theory of 'social representations', which is a psychological re-working of the Durkheimian concept of 'collective representations' (Moscovici, 1981, pp. 184-5; 1984, pp. 16-19; cf. Farr, 1984). The theory, it has been claimed, is capable of replacing attitudes and social cognitions as the unifying concept of social psychology (Moscovici, 1982). While Moscovici nowhere offers a precise definition of social representations, he indicates that they are to be thought of as:

systems of values, ideas, and practices with a two-fold function: first to establish an order which will enable individuals to orient themselves in and master their material world, and second, to facilitate communication among members of a community by providing them with a code for naming and classifying the various aspects of their world and their individual and group history (1973, p. xiii).

Jahoda (1988; see also Rätty & Snellman, 1992) has pointed out that Moscovici's work contains conceptual unclarity concerning the term 'social representations', as it has been used to refer to everything from individual cognitive processes (Moscovici, 1982, 1984) to ideological systems of society (Moscovici, 1961/1976, 1981, 1984). It has been suggested that the apparent ambiguity of the concept may be due at least in part to the fact that the central statements of the theory were written over a twenty-five year period (Parker, 1989), although McGuire (1986) has argued that there is inherent ambiguity in psychologists' use of the term 'social', even apart from its connection to the word 'representations'.

Some of the clearest statements of the theory of social representations, and the area of research which has arguably been most productive, have concerned the public's representations of science. The guiding question of this research has been: "What happens to a scientific discipline when it passes from specialists into society?" (Moscovici & Hewstone, 1983, p. 99). Moscovici's first (and possibly most well-known) effort (1961/1976) dealt with the diffusion of psychoanalytic language into popular culture. Empirical observation confirmed that the use of scientific concepts was transformed once Freudian theory became socially-represented.

Philosophers such as Larry Laudan (1977) have acknowledged the importance of bringing empirical issues falling within the domain of social psychology to bear on the history and philosophy of science. Laudan has coined the term 'cognitive sociology of science' for the study of science and knowledge which is "predicated on the existence of determinable correlations between the social background of a scientist and the specific beliefs about the physical world which he (or she) espouses" (1977, p. 217). At the same time, however, Laudan has lamented the fact that there are very few studies which successfully make such connections. It is argued here that Moscovici's work on social representations may contribute to the objectives of a cognitive sociology of science, or what might be termed the "social psychology of scientific knowledge" (e.g., Gholson et al., 1989). This use of Moscovici's theory appears to be justified, since "from its inception, the notion of social

representation was conceived in order to study how the game of science becomes part of the game of common sense" (Moscovici & Hewstone, 1983, p. 101). Farr (1984) notes in his review of the literature on social representations that "(the) link here with studies in the sociology of knowledge is an obvious one" (pp. 129-30), although, as Potter & Billig (1992, p. 17) and Ibañez (1992, p. 25) have remarked recently, it is a link which is thus far unexploited. Before dragging in some of the philosophy or sociology of science issues, I turn now to Moscovici's concept of 'objectification', for I will argue that it provides a useful way of understanding scientific beliefs in 'ontological realism'.

THE PHENOMENON OF OBJECTIFICATION

According to Moscovici & Hewstone (1983), there are three major 'transformation processes' whereby scientific knowledge becomes part of common sense: personification, figuration, and ontologization. I shall deal exclusively with the third of these, which is the tendency on the part of the layperson to 'objectify' or 'reify' scientific concepts and theories (Moscovici, 1981, 1984). The net result is an "'ontologizing' of logical and empirical relations" (Moscovici & Hewstone, 1983, p. 112). The authors have in mind a social psychological transformation of the scientist's metaphorical or purely representational use of certain concepts and theories into concrete objects which are imbued with ontological reality. By ontological reality, I mean simply that they are assumed to exist, as part of the mental or physical 'furniture' of the world (e.g., Putnam, 1982). In other words, the metaphorical nature of the concepts has been changed. For example, Moscovici writes that:

At this point, the concept or entity from which it seemed to emanate is stripped of its abstract and arbitrary character and seems to be endowed with a nearly physical, autonomous existence (1981, p. 200).

The upshot of this sociocognitive shift is that amateurs will tend to alter the scientific metaphors of the experts. The resulting belief on the part of the amateur, therefore, is that theoretical concepts and entities have a real, physical existence.

To the question, why does this transformation occur, Moscovici gives at least two responses. First, he argues that for the layperson the transformation allegedly serves the psychological function of reducing uncertainty about and increasing familiarity with the abstract forces of the physical and social world (Moscovici, 1981, esp. pp. 190-2). The process is one whereby the unfamiliar is made to seem familiar:

Objectification saturates the unfamiliar concept with reality, changing it into a building block of reality itself (Moscovici, 1981, p. 198).

Thus, the objectification of scientific concepts is said to help the public to demystify the philosophical, abstract nature of scientific theorizing. By transforming theory into reality, the layperson also succeeds in reducing the unpredictable aspects of the environment. Moscovici's explanation of the phenomenon of objectification in terms of the reduction of uncertainty places it squarely within a tradition of social psychological theorizing owing especially to the work of Festinger.

Moscovici's second explanation for the occurrence of objectification, though, is somewhat less conventional. He presents the phenomenon of objectification as if it were an inevitable artifact of representational grammar itself, writing that, "Words do more than represent things; they create things and pass on their properties to them" (1981, p. 202). In this way, ontological beliefs may arise almost automatically from language. Moscovici adds

that these "representations are *prescriptive*, that is they impose themselves upon us with an irresistible force" (1984, p. 9). His point, I think, is that representational schemes are powerfully capable of determining the structure of thought and belief.

By linking ontological beliefs, or beliefs about reality, to grammatical or representational origins, Moscovici takes a position which is very similar to the later Wittgenstein (1953, 1967, 1980), who urged that we must abstain from inventing mental and physical entities to accompany our language of psychological expression and instead "reject the grammar which tries to force itself on us" (1953, § 304). For present purposes, the main suggestion is that the grammar of scientific theories may lead amateurs to believe in the existence of entities which, for the scientists themselves, serve predominantly heuristic purposes. In other words, the language of the scientist is assumed to refer to actual physical objects. Moscovici writes that:

When this takes place, images no longer occupy that peculiar position somewhere between words which are supposed to have a significance and real objects to which only we can give a significance, but exist as objects, are what is signified (Moscovici, 1984, p. 40).

The phenomenon of objectification, then, arises when the heuristic models of the scientist are assumed to signify objects which actually exist in the world. This is at least moderately similar to Wittgenstein's observation that we often infer on the basis of games we play with language facts about the reality of the referents of our terms. An important dissimilarity, however, between Moscovici and Wittgenstein is that Moscovici implies that the layperson's use of scientific concepts is distortive and impoverished relative to the experts, while Wittgenstein emphasizes the degree to which philosophical 'experts' mistake ordinary language for metaphysics.

BELIEF IN ONTOLOGICAL REALISM

Moscovici begins both of his central statements on the phenomenon of objectification with an example from the history of science, recounting the British physicist Maxwell's remark that what seems abstract for one generation becomes concrete for the next (1981, p. 198; 1984, p. 37). Moscovici goes on to claim that it is the objectification of social representations which accounts for such a process. He even suggests that: "We might indeed improve on Maxwell's statement by adding that what is unfamiliar and unperceived in one generation becomes familiar and obvious in the next" (1984, p. 37). At any rate, it seems clear that objectification for Moscovici involves ontological beliefs, or beliefs about reality, such as those held by scientists. The process of objectification therefore corresponds to the adoption of scientific beliefs in ontological realism.

I take it that for Moscovici the essential aspect of the tendency towards objectification involves:

transforming an abstraction into something almost physical, translating something that exists in our thoughts into something that exists in 'nature' (Moscovici, 1981, p. 192).

The concept of objectification, then, refers largely to the construction of ontological beliefs. It is a process whereby "*figures are transposed into elements of reality*" (1981, p. 200). When the concept of objectification is applied to beliefs about science, as Moscovici intends, the emergent belief in "something that exists in 'nature'" is equivalent to a belief in

scientific realism or, in van Fraassen's (1976) terms, an 'epistemic attitude' which is consonant with realism.

One of the leading proponents of realism in the philosophy of science, Roy Bhaskar (1978), has noted the representational nature of scientific description and explored the consequences of this social fact for scientists' 'ontological' beliefs. He writes that:

The scientist seeks to describe the mechanisms generating the phenomena; but the results of his (or her) activity belong to the social world of science, not the intransitive world of things. Does this mean that it is wrong to talk of the scientist explaining events, describing mechanisms, etc.? No: provided we remember that what is explained in any concrete scientific episode is always the event known under a particular description. This does not mean that the event is, or that we must think of it as if it were, its description. On the contrary, the ontological independence of the event is a condition of the intelligibility of its description (p. 190, emphasis added).

The Moscovician hypothesis, I think, says almost the opposite. It claims that scientists may do fine in their descriptions of mechanisms without presupposing the actual existence of their concepts or theoretical entities. The 'ontological independence' occurs only later, when amateur outsiders mistake 'representational talk' for 'ontological talk'. Beliefs in ontological realism arise, not out of philosophical or scientific necessity, but out of sociocognitive tendencies towards objectification.

In other words, objectification is the process that leads one to "ontological realism", which has been defined in the following way:

Ontological realism, with respect to theoretical entities, is the thesis that at least some of the entities described by scientific theories have real existence in precisely the same sense as physical objects (Greenwood, 1989, p. 38).

Defined in this way, belief in ontological realism is extremely close to Moscovici's notion of objectification, which is the tendency to endow theoretical entities "with a nearly physical, autonomous existence" (1981, p. 200), to assume that they "exist as objects" (1984, p. 40), and to give them "ontological life" (Moscovici & Hewstone, 1983, p. 112). Objectification occurs when theoretical entities are transformed into real things. Moscovici's concept of objectification, when applied to scientific domains, is almost synonymous with the epistemic attitude known as 'ontological realism' to philosophers of science.

A somewhat surprising consequence of Moscovici's theory of social representations, then, is that *amateurs should be more likely to be ontological realists about theoretical entities than should professional scientists*. This is a surprising claim because it contradicts common assumptions to the effect that professional scientists are, by and large, realists about their theories and concepts, and that sceptics, philosophers, and ordinary folks are more likely to be the ones who adopt instrumentalist positions. From the standpoint of the philosophy of science, it is a counter-intuitive prediction that belief in ontological realism should be more prevalent among laypersons than among experts.

Without using the term 'ontological realism', Moscovici and colleagues make just this prediction. For example, Moscovici & Hewstone (1983) claim that while physicists may "hesitate in their belief in the reality of material phenomena such as 'wavelengths', 'particles', 'fields', and 'black holes'" (p. 112), this caution may be lost when these representations become shared by the general public. The authors also cite as an example of the objectification of science the popularization of brain laterality research, the result of which has been an 'ontologization' of the brain: "not only are the contents of each hemisphere

differentiated, but the single brain is replaced by two" (p. 114). In both of these cases, the experts are seen as speaking figuratively, simply employing their "preferred analogies and metaphors" (Kuhn, 1962, p. 184, quoted above), while the amateurs transform the theories into statements about actual physical objects. Belief in ontological realism, on this view, emerges from a social psychological tendency towards objectification.

SOME HYPOTHESES CONCERNING SOCIAL REPRESENTATIONS AND SCIENTIFIC BELIEF

The most basic theoretical assumption of Moscovici's treatment of objectification is that outsiders are more likely to believe in the physical reality of scientific constructs than are the experts themselves. From this notion a number of related hypotheses for the social psychology of science can be derived. By comparing the epistemic attitudes of experts and non-experts in two scientific disciplines (e.g., physics and psychology), it would be possible to determine if there are differences in attitudes towards the ontological reality of phenomena as a function of the scientific domain (whether it is in the individual's area of expertise or not). Because "professional scientists are nearly always amateur scientists outside their specialized fields" (Moscovici & Hewstone, 1983), it would be possible to compare the attitudes of professors (and graduate students) of each of two disciplines -- for instance, psychologists could represent laypersons for the scientific domain of physics, while physicists could act as the amateur control group for psychological domains. The basic Moscovician hypothesis is that ontological commitments will be higher when a scientist is asked to make judgments about a field in which he or she is not a specialist. In what follows, I shall propose six hypotheses for the social psychology of science based on Moscovici's concept of objectification.

I. General Hypothesis:

Scientific experts will be less likely to assume the physical reality of theoretical constructs in their own area of specialization than in other areas. This is presumably because the expert, unlike the layperson, appreciates the heuristic quality of his or her representations. An empirical consequence of this view is that physicists should be more likely to be 'realists' about psychological entities and theories than psychologists, whereas psychologists should be more likely to be 'realists' about physical entities and theories than physicists. Belief in ontological realism may be hypothesized to manifest itself in at least two specific ways, which are described in II and III.

II. Judged likelihood that theoretical concepts refer to actual entities:

To the extent that subjects are ontological realists about scientific phenomena, they should judge the possibility that theoretical concepts refer to actual, physical entities to be more probable. A sample question for the domain of physics might be: "Granted that many and various phenomena behave as if matter were made of molecules, how likely is it that matter is really made of molecules?" (Miller, 1987, p. 355). The second hypothesis is that *scientific experts will judge the probability that their theoretical constructs refer to actual entities to be lower in their own area of specialization than in other areas.*

III. Strength of agreement or disagreement with ontological statements:

Belief in ontological realism is also expected to manifest itself in stronger endorsements of statements which make ontological claims, or claims about existence. Subjects could be asked to indicate their degree of agreement with various ontological propositions such as: "The left hemisphere of the brain controls verbal and analytical knowledge, while the right brain is the seat of global and perceptual knowledge" (Moscovici & Hewstone, 1983, p. 114). Scientific realists, presumably, would express more agreement with such statements. Therefore, the third hypothesis is that *scientific experts will agree less (or disagree more) with ontological claims in their own area of specialization than in other areas.*

IV. The Descriptivist Hypothesis:

Not intimately related to ontological realism per se, but possibly diagnostic of objectification are epistemic attitudes on the familiar (at least since Dilthey) philosophy of science issue of description vs. explanation. The present hypothesis is that *scientific experts are more likely to see their theories as descriptive, whereas non-experts are more likely to conceive of them as serving an explanatory function.* Moscovici & Hewstone (1983) explicitly make this claim, noting that there is an "almost automatic passage from description to explanation" (p. 113) in the popularization of science.

V. The Faith in Progress Hypothesis:

A major concern of post-Kuhnian philosophy of science has been the degree to which scientific knowledge is cumulative or progressive. 'Sceptical' or 'relativistic' or 'anarchistic' or 'social constructivist' responses to this issue have been that different scientific theories are accepted at different times largely because of social or political forces which make them attractive to the current community of scientists (e.g., Barnes & Bloor, 1982; Collins, 1983; Feyerabend, 1975, 1978). According to such views, theories replace one another not because they are more 'true' or 'realistic', but because they are more persuasive to a particular community (e.g., Knorr-Cetina & Mulkay, 1983; Latour, 1987). Relativism has often been opposed by proponents of realism, who declare that science does progress, and that succeeding theories are better than their predecessors on primarily rational grounds. Thus, scientific realism in general should be associated with the belief that theories are progressive, or that succeeding theories are better than earlier ones on (purely) scientific grounds.

The present hypothesis is that *scientific experts will be more cautious, sceptical, and less likely to assume that succeeding theories are more true than their predecessors, whereas non-experts will perceive more certainty, consensus, and progress.* Moscovici & Hewstone (1983) for example, write that "lay people tend to overestimate the certainty and consistency of science" (p. 113). Subjects' faith in scientific progress may be gauged by asking them to indicate their agreement or disagreement with items such as: "Einsteinian mechanics entails that a body's shape is a function of its velocity and this disproves the Newtonian assumption" (Worrall, 1977). Scientific realists (and amateurs) are expected to offer greater support for items of this sort.

VI. The Professional Socialization Hypothesis:

All of the above empirical relationships are conceived of as joint products of both professional experience and socialization, and they should therefore be developmentally-mediated such that *graduate students and scientists early in their careers may be expected to behave more like non-experts, that is, to exhibit signs of objectification such as belief in ontological realism, faith in progress, and the explanatory use of theories than more advanced graduate students and professional scientists.* As the individual is subjected to processes of professional socialization, it is predicted that he or she will increasingly eschew ontological realism and progressive assumptions, while employing scientific theories (in his or her domain) descriptively and metaphorically.

SUMMARY

Six postulates for the social psychology of scientific beliefs have been proposed. From Moscovici's concept of objectification, whereby "*figures are transposed into elements of reality*" (1981, p. 200), a number of predictions about the public's conceptions of scientific representations can be generated. Most importantly, laypersons are seen as more likely to hold scientific beliefs which are consonant with ontological realism than are professional scientists. If supported, this hypothesis would contradict many current assumptions about the epistemic attitudes of scientific practitioners.

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