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REGULAR ARTICLE

Science at the Supermarket: Multiplication, Personalization and Consumption of Science in Everyday Life

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Abstract Which is the kind science's psychological guidance upon everyday life? I will try to discuss some issues about the role that techno-scientific knowledge plays in sense-making and decision making about practical questions of life. This relation of both love and hate, antagonism and connivance is inscribable in a wider debate between a trend of science to intervene in fields that are traditionally prerogative of political, religious or ethical choices, and, on the other side, the position of those who aim at stemming "technocracy" and governing these processes. I argue that multiplication, personalization and consumption are the characteristics of the relationship between science, technology and society in the age of "multiculturalism" and "multi-scientism". This makes more difficult but intriguing the study and understanding of the processes through which scientific knowledge is socialized. Science topics, like bio-tech, climate change, etc. are today an unavoidable reference frame. It is not possible to not know them and to attach them to the most disparate questions. Like in the case of Moscovici's "Freud for all seasons", the fact itself that the members of a group or a society believe in science as a reference point for others, roots its social representation and the belief that it can solve everyday life problems.

Keywords Multiplication · Personalization and consumption of science in everyday life · Social representations · Common sense · Sense-making

Introduction: A Practical Question

In the morning, I wake up with a stiff neck. I open the medicine cabinet in my bathroom, looking for a good remedy. I pick up a confection and start to read if it is the most suitable for the use (Fig. 1).

I consider myself a quite educated person, nevertheless I soon get confused. I am just looking for a simple sentence that sounds more or less like "this drug is for stiff neck pain"

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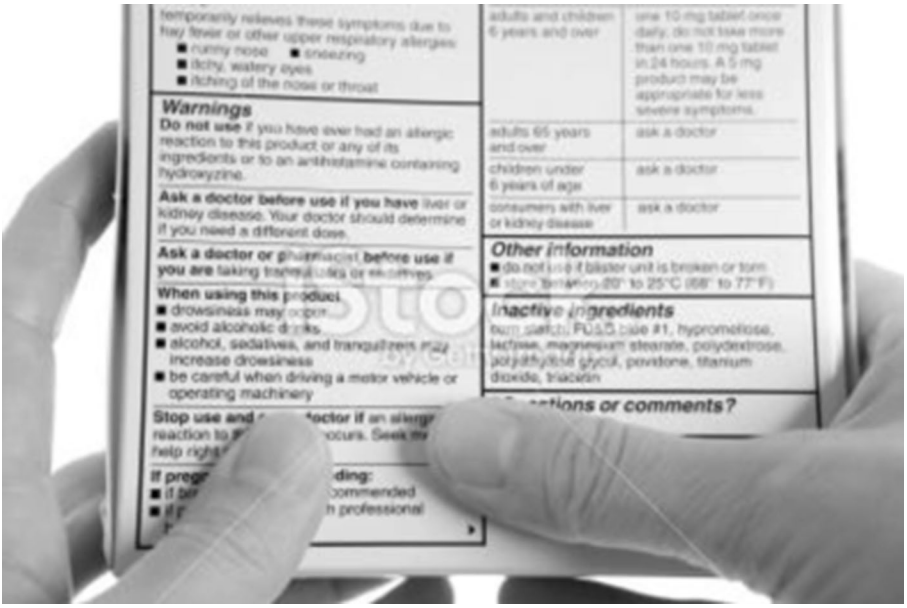

Fig. 1 The instruction on a medicine packaging

or instead "this drug is for an attack of indigestion", but no way. I spent a bunch of minutes trying to make it out, but I feel more and more confused and ignorant. Then I decide to call my doctor, but it is Saturday morning, I will not find him. At this point, I remember that a friend, some days before, told me about his headache and mentioned a miraculous drug that made it immediately pass off. How was the name? I try to recall it, but only partially succeed. Then I decide to Google it, using the incomplete information I have. A world of information about stiff neck, pain, drugs, and even alternative remedies suddenly opens before me. I get even more confused. Finally, I decide that all in all the pain is bearable and I go to the kitchen for the morning coffee.

This short narrative can exemplify a situation in which everyone find himself at least once in a lifetime. Probably, the most of people are not so helpless like I am before a situation in which very limited thought useful scientific knowledge is required. It sounds trivial to claim that today we live immersed in science and technology. We do not realize until we need to go beyond the transparency of the normal functioning of things around us. We *assume* that science surrounds us and plays a fundamental role in our everyday life, like a man of the 13th Century could have assumed that his life was guided by the omnipresent and omniscient gaze of God. This comparison is not accidental. Otto (2012), discussing the role of scientific issues in United States presidential campaigns, depicts a kind of radical opposition between science and religion in American public debate. "Public discourse is reduced to endless warring opinions, none seen as more valid than another" (Otto 2012, p. 71).

We *know* that somewhere else there is someone with a specialized knowledge working in a kind of institution devoted to the progress of science, that sooner or later will further affect our lives. Until everything fluently works, we just need to make some acts of worship, like donating some money to a research institution, or reading some news about the last discoveries in the scientific section of a magazine. This is enough to

provide us with the knowledge required to *make* our everyday choices, such as purchasing a good or a food, deciding which behavior is healthy, and even providing a topic for friendly conversations. The story also depicts the different sources we rely upon in managing everyday knowledge. We start from what we know, what we believe, what other people know and what some authoritative sources provide us. These are the ways in which, through communication processes, we get in relation with scientific knowledge. This is a process that takes place everytime everywhere, and becomes salient when we face a rupture in this flow.

Which is the kind science's psychological guidance upon everyday life? I will try to discuss some issues about the role that techno-scientific knowledge plays in sense-making and decision making about practical questions of life. My point will be that there are three dimension to be further explored in such a relationship: multiplication, consumption and personalization.

Science: A Matter of Love and Hate?

The contemporary social arena is housing an ambiguous engagement relationship of love and hate, antagonism and complicity between science and society (Otto 2012). The precipitate is a public debate between the promoters of an intervention of science into field traditionally prerogative of political, religious or ethical choices, and, on the other side, the position of those willing to stem "technocracy" and governing science (Bucchi 2004, 2009). Such a dichotomic view is actually more articulated, involving several social groups with different set of scopes and identities, that contribute to the creation and circulation of social representations of scientific knowledge objects in the media (Bauer and Bucchi 2007; Moscovici 1976/2008).

The distinction between "science" and "common sense" was systematically established by John Locke in 1689. In *An Essay Concerning Human Understanding*, he stated that knowledge is based in a systematic observation of the physical world, anything else is "but faith, or opinion, but not knowledge" (Locke 1689/1824, p. 249). An opposition between what is "science" and what is "not-science" is clearly established, with the concept of justified "belief", somewhere in the middle (Fig. 2). On the other hand, Giambattista Vico presented a more articulated relationship between what is science or not in the 3rd edition of the *New Science* (Vico 1744/1948): there are different forms of knowledge related to different kinds of truth: a) the "Truth" (*verum*), which only pertains to God; b) the "common sense" (*verum certum*) which is the practical knowledge and belief achieved through practices and consent; and c) the "truth through

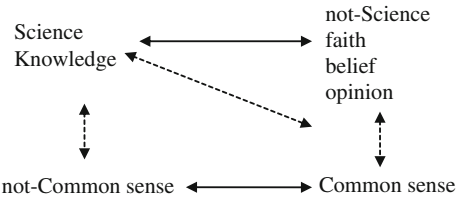

Fig. 2 Complementarity vs opposition

making" (*verum factum*), which is the scientific knowledge about all the products of human activity.

The opposite of "science" should be what is "not-science", while in the history of science, as well as in common science, direct relationships of opposition are established (dotted lines). Science and not-science are not opposing concepts rather complementary. It is true that establishing the set of procedures and constraints that guide the scientific activity, at the same time, establishes the boundaries of what lies outside science. Nevertheless, the identification of the terms in two different complementary couples of oppositions (science/not-common sense and common sense/not-science) results of a representational and social process (Valsiner 2012). This confusion derives from the fact that we can consider "science" and "society" at different levels, that are strictly interwoven, but must not be ontologically confused. A first level is that of different modes of knowledge, opposing *episteme* and *doxa* (Musgrave 1993). They differ in the form, the procedures, the aims and the grounding of knowledge (Jovchelovitch 2007; Moscovici 1976/2008; Radu 1991). These different modes of knowledge usually belong to specific social groups but do not identify with them (Latour 1987; Moscovici 1976/2008; Valsiner 2012). The individuals and groups inhabiting the social territories of science and society are often mixing, switching, overlapping. The border zone of public engagement with science thus becomes extremely interesting because it represent the visible manifestation of this relationship in discourse (Bucchi 2009; Jensen and Wagoner 2009; Valsiner 2012). Besides, the different modes of knowledge can exist in the different groups, communities and contexts of activity, such as market/consumer, technology/enterprise, science/education, etc. A third level is that of the social representations of "science" and "society" as discrete and monolithic entities. These representations, or the social representation of this opposition (Fig. 2), has its contemporary historical roots in Positivism (Bucchi 2004; Moscovici 1976/2008; Valsiner 2012), but its historical genesis can be traced back to the 18th and 19th Centuries struggle "for who would set up the intellectual landscape of science" (Valsiner 2012, 101). Mumford (1934) dated back the origin of the science-society dichotomy to the 14th Century, when the scientific research methods and the rationalist epistemologies start to be defined. Also the human and economic forces that triggered scientific and technological development were shaped at that time. To exactly measure time and space, to generate alternative power to muscular strength were needs of the rising industrial and commercial economies of the Western countries. Those forces fostered research, inventions and machineries. Progressively, scientific explanations replaced religious believes also in common sense to interpret, make sense and order the reality. According to Mumford (1934), this originates the feature of "mysticism" and "religiosity" that scientific explanations will assume during the Enlightenment and positivist era, and to some extent they still have nowadays. Going back to our initial practical question, along this history of development of science/not science complex relationship, we lay people developed our own way to cope with scientific knowledge in everyday life with respect to the everyday processes of *knowing*, *assuming* and *making*. It is worth studying this process to the extent that both at individual and societal level "in an age when science influences every aspect of life—from the most private intimacies of sex and reproduction to the most public collective challenges of climate change and the economy—and in a time when democracy has become the dominant form of government on the planet, it is important

that the voters push elected officials and candidates of all parties to explicitly state their views on the major science questions facing the nation" (Otto 2012, p. 71).

A first theoretical contribution that psychology can provide to understand the articulation of these different levels is to inquiry how they can be analyzed and in both their relationships and their processes. Jovchelovitch (2007) proposes some dimensions to take into account when analyzing the different modes of knowledge and their social forms. Elaborating Moscovici's theory (1976/2008), she distinguishes about "who", "how", "what" and "what for" the social representations in different contexts of knowing. Such heuristic categories can account not only for "the dynamic components of representational processes but also central social psychological categories: identity and intersubjective structures; communication and practices; attribution, justifications and functions. The very diversity of these processes explains the diversity of knowledge and offers insights into the different 'desires to represent' behind a knowledge system" (Jovchelovitch 2007, p. 88).

By combining these framework dimensions with the distinction between different levels of understanding of science/society relation (modes of knowledge, social organization, social representations) it is possible to outline a social psychological approach to the study of science, technology and society. On the other side, without operating such an articulation of the levels, it would not possible to fully understand phenomena like new ecological practices or new health lifestyles, that involve complex interactions between the scientific and common sense modes of thought, the articulation between different stakeholders and the social representations of science and scientific knowledge. The development of the relations between science and society occurs essentially in the world of discourse, instantiated in the media and everyday conversations (Bauer and Bucchi 2007; Moscovici 1976/2008). In this process, there is no opposition rather complementarity between science and common sense. In the next section, I argue that Moscovici's Social Representations Theory can be a useful ground for this theoretical framework.

Maker's Knowledge and Knowledge for Making

Social Representations Theory (SRT) is a theory of social knowledge (Markova 2010; Moscovici 1976/2008), the role of communication, the relationship between scientific and common sense knowledge in everyday life—weave a complex conceptual architecture where these elements are combined in order to build an ambitious general theory of the way knowledge is constructed by the social interaction of individuals and groups. The object of social psychology, according to Moscovici, is the way human beings make sense of everyday experience and foresee conducts and events (Moscovici 1976/2008; Moscovici and Hewstone 1983). In this sense, SRT is a general theory of knowledge, based upon the idea that the relationship between knowing subject and known object is of collective, correlative and co-constitutive kind (Duveen 2002). We know the world as a product of structures and psycho-social processes, using as knowledge tools the concepts made available by a given culture, individual and group experiences, and the communication media we can access. "Individual or social representations make the world what we think it is *or what we think it must be. They show us that at each moment something absent is being added, and that something present is being modified. But the play of this dialectic has a broader meaning.*

Something that is absent strikes us, and our minds and our group set to work, but that is not because it is at first strange or something from outside our usual world. It is the fact that it is distant that surprises us and creates the characteristic tension" (Moscovici 1976/2008, p. 16). The creation of new knowledge starts from existing structures and from a relation of reciprocal constitution between subject and object, in such a way that the social construction of knowledge produces new realities of the world and these produce new psychological structures and practices in return. Paradoxically, we reach the conclusion that "*human knowledge is identical with the world as it is known, which does not imply that our knowledge of the world is complete*" (Duveen 2002, p. 141). It does not mean that common sense knowledge is doomed to be tautological or self-referential. It means, instead, that every knowledge needs structures, as far as knowledge *is* structure. In SRT theory, structures are exquisitely social, before being cognitive, and are also created and acted in social and communicative interactions. In such a general theory of social knowledge, Social Representations have a fundamental place just in relation with the psychological and epistemological functions they play:

- Epistemic functions: they are framework of meaning, a repertoire of concepts and values, to make understandable, to interpret and to explain phenomena, to link familiar and unfamiliar, new and existing, unknown and known. They serve to provide a sense and an "answer" to everyday life events and an orientation for the conducts to be adopted;
- Identity functions: sharing a Social Representations is function of the group belonging and its emergence is related to the menace that the apparition of a new knowledge hangs over this identity;
- Communicative functions: Social Representations regulate, organize and orientate social communications, by providing a common ground to make possible the interaction. At the same time, they define the battle field for the argumentative struggle between groups (Tateo 2008).

Just as regards the epistemic (describe, classify and explain), identity (sharing a social representation is function of group belonging) and communicative (regulation and orientation of social communications) functions of social representations, emerges the tension characterizing the relation between scientific and common sense knowledge. This tension, I argue, is related to the fact that everyday life requires exactly what beliefs provide, that is the empirical and ethical ground for knowing, assuming and making. What was apparently something in between knowledge and opinion, appears as a central concept for understanding these processes. According to the popperian perspective, everyday knowledge is based on justified true belief, according to the conditions that: A believes P; P is true, and A can justify his belief that P (Musgrave 1993). But this definition of knowledge, which includes explanations and generalizations, is in general applicable to both science and common sense, unless you do not take into account the *process of knowing*, that is the procedures of seeking and elaborating knowledge. Jovchelovitch argues that both common sense and science "are forms of knowledge linked to social modalities of representing. As with all representation, they fulfill functions of identity, community, memory, anticipation and ideology" (2007, p. 106). Just as regards the epistemic (describe, classify and explain), identity (sharing a social representation is function of group belonging) and communicative (regulation and orientation of social communications)

functions of social representations, emerges the tension characterizing the relation between scientific and common sense knowledge. Modes of knowledge are related to the historically given forms and procedures of creation, circulation and use. Scientific knowing is indeed based on domain specific procedures, organizations and epistemologies that guide the way we can form, prove and generalize the content of statements about P. It was exactly Vico (1744/1984) that understood in a very thoughtful sense that we know what we make. It means that the knowledge about the process of making (e.g. how I construct the experimental setting and how I verify my hypothesis) is a fundamental part of knowledge itself. In this sense, Niels Bohr's epistemology is perfectly aware of this point (Favrholdt 1999). "The complementarity argument deals with our conditions for description and is therefore a statement of epistemology" (Favrholdt 1999, p. XXIV). But in the science/society relationship, what is socialized concerns only the knowledge, not the process of knowing. In this sense, the border between the two is based on a boundary object, the controversial knowledge, rather than on boundary practice (Gieryn 1999).

The same remark can be made with respect to the explanatory function of any mode of knowledge. "Explaining is answering a why (or how) question, whereas an explanation is a regimented and simplified representation of the answer. The former is a complex and ramified question/answer structure, the latter the public summary of the answer" (Bogdan 1991, p. 193). Both in public and private discourse, the boundary object between scientific and common sense modes is "determined by such pragmatic factors as uncertainty, curiosity, novelty, available evidence, alternative hypotheses, and so on" (Bogdan 1991, p. 193). In this sense, the function of making sense of novel knowledge framed in social representations, making familiar the unfamiliar, works on the explanation, leaving out the complex and methodologically regulated scientific process of explaining.

Besides, the relationship between A-knower, P-knowledge, and P-knowing is co-constitutive. Scientific knowledge is constituted through the codified process of knowing, by people that are identified as scientists working in a research institution, academic or not. At the same time, the scientist is someone accredited to work in a research institution on a scientific topic, not on mesmerism. Finally the scientific procedure has its own devoted people responsible for evaluating research such as peers or decision makers, and must be carried out in the right institution (Valsiner 2012). The co-constitutive process works also in common sense, to the extent that P-knowledge to be considered "scientific" must come from a legitimated A-knower or institution. On the other hand, the area of P-knowledge legitimates the A-knower as a "scientist", as far as they meet the hierarchy of knowledge areas encoded in social representations. A physic is more scientific than a historian, for instance. Thus, in a certain sense, all academics are scientist, but some are more scientists than others.

This aspect bring us to another relevant boundary aspect: the ownership of knowledge. Socialization of knowledge produced in a specific scientific or technological context also implies a change in the ownership of such a knowledge. This dimension is assuming a particular relevance in the contemporary relationship between scientific and non-scientific communities.

> "*[A]ll knowledge requires a knower, all knowledge is possessed by some person or other. The same proposition may be known by one person and only believed by a second, if the first person can justify her belief while the second cannot. As we will see, this has important repercussions for the question of whether we can*

acquire knowledge from other people, by hearing them talk or reading what they write. The emphasis upon personal knowledge, knowledge which requires a knower, contrasts with various impersonal uses of the term 'knowledge'. We say things like 'Scientific knowledge made great advances in the seventeenth century' or 'Chemical knowledge is now so vast that no single person can grasp it all' or 'There is more knowledge stored in the University Library than in people's heads'. In such statements there is no mention of any knower. It can be argued, however, that these impersonal uses of the term 'knowledge' are very much derivative uses, that the body of scientific or chemical knowledge is built up because individual scientists or chemists came to know things in the fundamental personal sense" (Musgrave 1993, 9).

Dealing with knowledge as boundary object between different contexts of knowing also implies the change in the ownership. The scientific mode of knowledge shows an ambivalent attitude toward the problem of ownership. On the one hand, it tends to detach knowledge from the subjectivity that creates it, presenting science as a collective impersonal enterprise, guided only by rational and disinterested motivations (Jovchelovitch 2007; Musgrave 1993). On the other hand, scientists are very passionate and particular of their patents and copyrights (Valsiner 2012). Ownership in common sense mode of knowledge has instead interest as characteristic feature (Fig. 3). In this case, the conditions of knowledge (A believes P; P is true, and A can justify his belief that P) are oriented to the individual or group goals and projects (Jovchelovitch 2007), including a fourth condition of P-interest which is "P is useful for A".

From the parents interested in psychoanalysis and education (Moscovici 1976/2008) to the public participating in science festivals (Jensen and Buckley 2012), what really matters is usefulness in everyday questions, practicalities and dilemmas. Thus, the boundary object as a twofold character, on the side of scientific mode of knowledge is defined by the P-knowing, while on the common sense side is characterized by the P-interest.

The Role of Communication

According to Moscovici (1976/2008), the mark of postmodern societies is the process through which the system of scientific production constantly introduces new social objects and new knowledge about the world, requiring common sense to elaborate new social representations. The apparent irreconcilability between the two classes of knowledge is that they originate from different points of view towards the common goal of making sense of reality.

In the case of the sharing from scientific knowledge to common sense, it is a socialization activity, while the opposite path is a form of rationalization, systematization, explanation and formalization of knowledge about the world based upon experience. In the former case it starts from words and P-interest, in the latter it starts from things and P-knowing (Moscovici and Hewstone 1983). The tension is generated in lay people by the necessity of handling two kinds of knowledge about a boundary object: first hand knowledge, deriving from common sense, direct experience and tradition shared by the group; second hand knowledge, deriving from scientific knowledge consumed, elaborated and adapted to everyday life (Moscovici and Hewstone 1983).

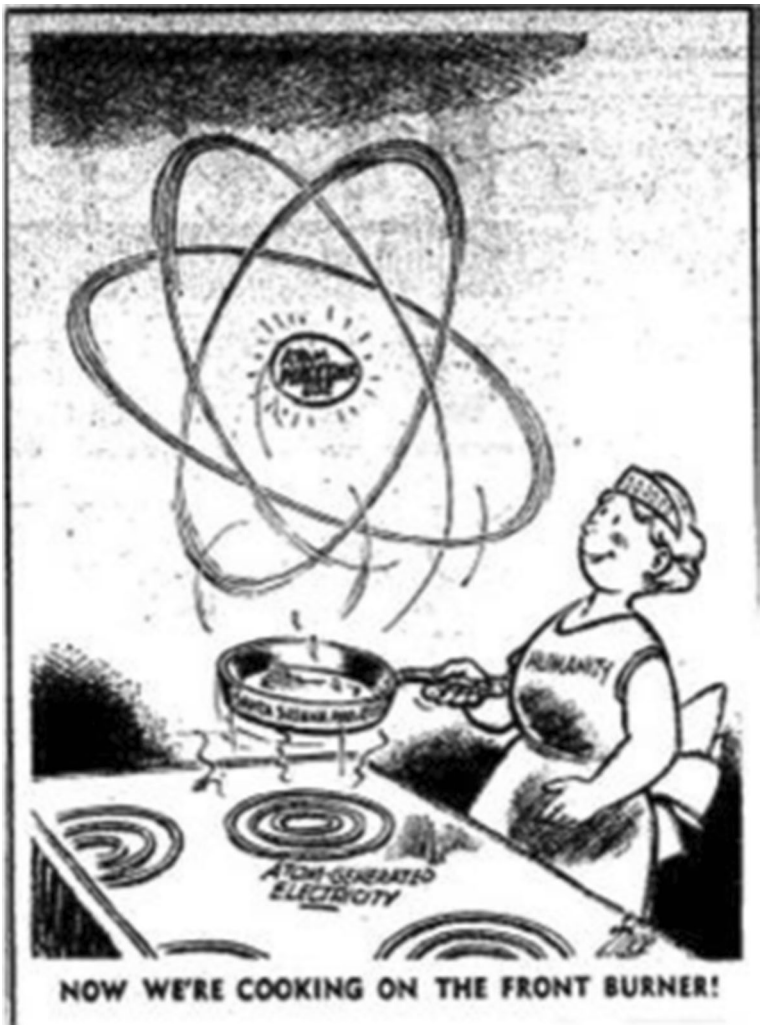

Fig. 3 A 1957 comic showing the interest in science achievements for everyday life

In practical situation, it means that if I need a drug for my stiff neck, I need to make a choice based on my interest for relieving my pain without knowing how the drug has been constructed and commercialized, but assuming that it has been done scientifically, as far as I know something about how science works in society. Until I can't see any controversial issue in this picture, my common sense knowledge works perfectly. When something goes wrong, instead, I discover that science asks me to give up my beliefs and to belief in science.

In order to study this process, Moscovici elected psychoanalysis: it was a growing phenomenon in France, extremely discussed in both the media and interpersonal communication; and it was a social object with a strong evocatory potential, touching topics such as mind, sexuality, the border between normality and madness, and the human nature itself, after all.

> "*When psychoanalysis speaks of childhood, dreams or the unconscious, it not only suddenly introduces a domain that is far removed from adult human life; it also sheds a light that surprises and shocks. Scientific or technological discoveries are striking in the strict sense of the word. The tension I allude to constantly betrays its origin, namely the incompatibility between the linguistic and intellectual possibility of understanding parts of the real to which the content refers. That content is strange because it is remote, and it is remote because it is strange*" (Moscovici 1976/2008, p. 16).

Nowadays, Moscovici would probably choose a social object with the same potential like biotechnologies, also toughing the human nature itself, in this case biological. This view of the science-society relationship seems to be one of the topical existing aspects of SRT, involving historical, epistemological and social dimensions.

Social Representations are the product of a reversal process in the relationship between science and common sense. In the past "*the vocabulary and the notions we needed to describe and explain ordinary experience, to predict events and behaviour and to give them a meaning derived from a language and a wisdom that regional or professional communities had accumulated over a long period*" and where placed at individuals and groups disposal through the common sense repertory (Moscovici 1976/2008, p. xxvi). Since the 19th Century, instead, sciences "*discover and describe most of the objects, concepts, analogies and logical forms we use to face up to our economic, political or intellectual tasks*" (Moscovici 1976/2008, p. xxvi). In Western culture, a new knowledge created by a techno-scientific mode of thought mustered on the borders of common sense. "*Societies often forbid their members to have a certain vision of things or to become part of an emerging culture (the Church, for instance, did so when it prevented Catholics from reading the works of Galileo and Copernicus). When a new science develops on the fringes o fan individual's intellectual filed, it is a harbinger of conflict. It raises questions to which we do not have answers, and gives answers to questions we had not foreseen*" (Moscovici 1976/2008, p. 52). This reversal has a sort of circular side effect in which scientific and technological knowledge creates new forms of reality (Mumford 1934), new social objects and new social dilemmas that is understood can be solved just inventing new technologies (Barash 1986). Some examples of this process are: the so-called disease mongering, that is the progressive medicalization and redefinition of some behaviour as pathological states requiring pharmacological treatment (Bucchi 2004, 2009); the discovery of the "gene of the week" responsible for specific behaviours or characteristics, such as the proneness to some diseases, some particular cognitive or sport abilities, but also the preference among sweet and salty; the multiplication of complexes described by Moscovici (1976/2008). The analogic process involved in common sense could somehow exert an influence also in the construction of the scientific discourse, and maybe in the scientific mode of thought, at least because meets the interest of science, understood at the level as social organization of economic and industrial system of production, to widen its area of influence and its volume of business. "Within larger power relations that operate in any given society these effects can be, and certainly are, used by various social groups at various times to pursue interests and produce effects associated with strategic projects" (Jovchelovitch 2007, p. 33).

In the sharing from scientific to wider communities, scientific concepts progressively lose their provisional and controversial character, typical of scientific debates, and where filtered, compacted and transmitted in the passages from academic to school textbooks and finally to mass media. Nevertheless, Moscovici (1976/2008) underlined that this transmissive model was an oversimplification and an abstraction rather than an actual process. Scientific concepts, as soon as they enter in contact with other social groups, are not vulgarized but socialized, re-elaborated and put on a lay knowledge system with its own rules, modes of thought and scopes.

Besides the scientific academic community a plurality of subjects emerged, such as high tech firms, environmentalists organizations, patients and caregivers associations, citizens movements elaborating ad disseminating scientific contents (Bauer and Bucchi 2007; Bucchi 2009). Secondly, scientific publishing channels increased as well as the number of published articles (Bucchi 2009), also fomenting doubts about the risks of lowering scientific quality standards and of fostering the research on topics that could be "interesting", "fashionable" and able to catch the attention of media and audience. At the same time, the multiplication of publishing channels facilitated the access of minority and innovative positions, that would otherwise found the road blocked by mainstream paradigms (Valsiner 2012). Other relevant factors are the development of scientific journalism, that is today present in all the general media, and the possibility, even by the lay people, to access directly a vast amount of scientific information and open access journals via web. The consequences of these changes are to make more visible the process of construction of scientific knowledge "in its making" (Bucchi 2009; Valsiner 2012) and to question the myth of science as a monolith. In order to fully understand the implications of these changes, suffice to think about the climate change debate. Public opinion worldwide has been able to watch the debate between totally opposite and controversial scientific theses about an issue affecting the future of the mankind, with a richness of information never seen before. At the same time, people can participate in this debate and verify the way scientific arguments were used by different political wings to support their positions and choices. From the point of view of scientific communities, this implies the twofold consequence of undermining the confidence in research achievements and of producing the mediatisation of the scientist. The latter becomes aware of how much the ability to communicate his own work and the support, the positive attitude of public opinion have the same importance of scientific prestige and political backing in obtaining more resources.

Jensen and Wagoner (2009) have drawn a model of social change to account for the development and elaboration of scientific ideas in society through the role of media and public discourse. Their model includes four processes. First, different social actors clash over normative ideas become controversial, for instance the public's understanding of science (Jensen and Wagoner 2009), through communication processes that lead to the emergence of new ascendant ideas and norms. Progressively, the new ideas and norms enter the context of social and professional practice, in which they are implemented and even resisted. After that, the new ideas and norms gain access to public engagement processes, entering in contact with everyday life practices, norms, values and beliefs. If the new ideas do not match the existing values and beliefs, they become controversial and can be rejected by the community. Finally, if the new ideas have not been accepted by the community, they are subject to a deliberative process aimed at overpassing the problem by re-opening the public debate. Jensen and Wagoner (2009)

also consider a number of meta-factors involved in the cycle of social change, such as the mass media, the identity and power relationships, etc. This model is deeply influenced by Moscovici (1976/2008) and Bordieu's distinction between kind of discourses: the doxa, the taken for granted "theses tacitly posited on the hither side of all inquiry," (1977, p. 168); the orthodoxy, the conservative opinion that tends to the re-establishment of previous doxa; and the heterodoxy, that contests the orthodoxy interpretations of the world by presenting alternative possibilities into the discourse (1977).

The macro-genetic model of Jensen and Wagoner (2009) focuses on the relationship between scientific discourse production, practice and public discourse, establishing a circular process that accounts for the open ended dilemmas that new controversial ideas always generate in the community. But the dimensions of identity, community, interests, power relationships that instead Jovchelovitch (2007) considers a constitutive element of the process at meso and micro-genetic level are left in the background. In the next section, I will present some concepts that could be used as heuristic tools to link the different levels of modes of knowing, social organization and social representations in the relationship between science and society.

Multiplication, Personalization and Consumption

In the light of the theoretical discussion about the different contexts of knowing in the articulation between scientific knowledge in everyday life, and the theoretical contribution of the SRT in understanding the communicative and cognitive processes implied, I would now try to define three interwoven concepts, that can be further developed to account for the changing relationship between scientific knowledge and common sense and its future trends: multiplication, personalization and consumption.

- *Multiplication*: the extended changes in post-industrial societies led to a multiplication of groups, identities, exchanges and scopes. Also specializations and channels of scientific publishing, sources of scientific and technological knowledge increased. Finally, both scientific concepts and products multiplied, as well as the production of discourses "*of*" and "*about*" science, to the extent that the border is increasingly populated by boundary objects.
- *Personalization*: the multiplication of concepts, technologies and audiences results in a process of personalization of science. In the era of "*mobile*", understood as individualization and miniaturization of technological functions, it is not surprising if even discourses and conducts around science and technology tend to become more and more personal, entering everyday and intimate spheres. Lay people never accept or reject science *en bloc*, with a complexity of positions already stressed in the 1950s by Moscovici (1976/2008). It is not rare to find articulated positions in favor of biotechnologies applied to the treatment of some diseases but not when used on human reproduction, or Catholics favorable to euthanasia and liberals against it. Besides, science is more and more requested to solve "personal" problems, and single countries or even regions undertake different policies on issues like research on contraception or death (Bucchi 2009).

– *Consumption*: is the other face of the same process involving personalization, in which science and technology, as social objects, become commodities (Valsiner 2012). As P-interest is one of the conditions for the socialization of knowledge in common sense, scientific concepts become both consumable and consumed, that is valuable with respect to their use and their social function (Baudrillard 2005; Bucchi 2004). At the same time, the consumption of given scientific concepts or technological products defines a range of distinctive criteria arbitrarily shaped on a range of stereotypic identities. Science and technology social objects "*work as categories of objects which, in the most tyrannical fashion, define categories of people*" (Baudrillard 2005, p. 209). My science consumption defines both me as part of a specific segment of society and the science as expression of a social group. Like Social representations, this elements of differentiation is organizing and "*demarcating (1) categories of needs within the consumer himself which now have but the remotest of relationship with the person as a living whole; and (2) categories—or status groups—within society overall which can be identified by means of some particular set of objects. Hierarchies of products and objects thus come to play precisely the same role as that formerly played by a range of distinct values: they become the basis, in short, of the group's ethos*" (Baudrillard 2005, p. 208).

Conclusion: Science at the Supermarket

Let me go back to my stiff neck, which by the way rose after this long reflection. I tried to make some initial reflection about the role of scientific knowledge, as it is socialized, in people's everyday life. According to Moscovici (1976/2008), what really matters for each and every individual is to answer everyday questions and dilemmas, such as "what's that thing", "what do I use it for", "how shall I behave", "what alternative I shall choose", "what I become with that"? Common sense knowledge serves perfectly this purpose, and it is not a matter of cognitive overload rather practicality. Scientific

Serving Size: 1 bottle • 1/2 L

Amount Per Serving	
Calories 0	Calories from Fat 0
	% DV
Total Fat 0g	0%
Saturated Fat 0g	0%
Trans Fat 0g	
Cholesterol 0mg	0%
Sodium 0mg	0%
Total Carbohydrate 0g	0%
Dietary Fiber 0g	0%
Sugars 0g	
NET Carbs 0	
Protein 0g	0%
Vitamin A 0% •	Vitamin C 0%
Calcium 0% •	Iron 0%

Fig. 4 The increasing complexity of product labels

knowledge makes sense as long as it can be embedded in this process. We are interested in science as far as it is useful at the supermarket. It would be not surprising at all if it hadn't been that in contemporary society supermarkets are more and more filled with science. When we look at products' labels on the shelves, we suddenly realize that we need quite advanced notions of chemistry, medicine and physics (Fig. 4).

But this type of knowledge can be used by lay people outside scientific communities in order to make decisions only if it is socialized through Social Representations in order to become commodities for individual consumption guided by group and personal interest. The interwoven processes of multiplication, personalization and consumption are thus the factor characterizing the socialization of science and the science-society relationship in the era of multiculturalism and multi-scientism (Otto 2012).

This growing complexity makes more challenging, fascinating and complex the study and understanding of the processes of scientific knowledge socialization. The topical value of interest in SRT is exactly in its epistemological power when looking at the discourses and practices in the relationship between scientific and common sense knowledge (Moscovici 1976/2008). These discourses and practices are functions, products and, at the same time, causes of the identity positioning of individuals and groups (Baudrillard 2005). The discourse "of" and "about" science is never neutral, despite scholars believes (Valsiner 2012), as long as it is always party of a suit in the semiotic arena: whatever it is used by political or religious groups to argue in favor of their own positions, or is used with an identity and instrumental function by the individuals to define, structure and hierarchize themselves and the others with respect to the world of science "consumers". Scientific issues, such as biotechnologies or climate change, thus become a sort of ineludible frame of reference one cannot avoid to refer to, that cannot be ignored and to which the most varied questions can be attached (Bucchi 2009). Just like in the case of psychoanalysis and "*Freud for all seasons*" (Moscovici 1976/2008, p. 121), the fact itself that the members of a group or a society are convinced that an object of science is a point of reference for the other people serves to root its social representation and to feed the belief that science can solve everyday life problems.

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