

# Individual Beliefs and Collective Beliefs in Sciences and Philosophy: The Plural Subject and the Polyphonic Subject Accounts Case Studies

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The issue of knowing what it means for a group to have collective beliefs is being discussed more and more in contemporary philosophy of the social sciences and philosophy of mind. Margaret Gilbert's reconsideration of Durkheim's viewpoint in the framework of the plural subject's account is one of the most famous. This has implications in the history and the sociology of science—as well as in the history and sociology of philosophy—although Gilbert only outlined them in the former fields and said nothing about the latter. Symmetrically but independently, a historian of science, Mara Beller, has recently challenged Kuhn's conception of the role of consensus in sciences in a brilliant analysis by carefully studying the history of Copenhagen School of Quantum Mechanics. Not only does she show the role of disagreement and controversies (doubting whether there was any collective belief characteristic in this group of physicists), but she even shakes up the very idea of individual beliefs. Each scientist (Heisenberg, Bohr, etc.) could be seen as divided into several selves. This paper contends that these two conceptions open important new horizons in several domains, especially if they are linked together. The paper assesses this claim in the light of empirical examples like the Vienna Circle, Copenhagen School, and, eventually, Cartesian philosophy.

*Keywords:* plural subject; polyphony; collective beliefs; Cartesian argumentation

The aim of this article is to reconsider a classical question in sociology (Durkheim, Lévy-Bruhl) by using new tools provided by recent philosophy of mind, philosophy of social sciences, history of science, and even theory of literature. This question can be expressed in the following way: what is individual and what is collective in beliefs?

There is an ontological dimension in this question that I will not elaborate on here. Can collective beliefs be said to exist in the same

way as individual beliefs exist? Do individual beliefs themselves exist in the same manner as individuals who have these beliefs exist? Is there a proper sense in which it can be said that groups who support collective beliefs exist?

There is also an epistemological dimension of the same general question, of which I will say more in this article. Durkheim and Lévy-Bruhl spoke of individual "representations" and collective "representations" without really being concerned with the differences, for example, between "having representations," "thinking," and "believing." It is now very common to introduce some clear-cut distinctions between "belief" and "acceptance" and even between some kinds of beliefs and some kinds of acceptances.<sup>1</sup> I will simply emphasize the aspect of (personal) commitment that can be present in some kinds of acceptances without however considering all the numerous discussions on this topic.

Eventually there is a sociological dimension of the same question, of which I will say much more. I will make a distinction between collective beliefs and social aspects of individual beliefs, and I will seek to analyze the various and sometimes complicated links between collective beliefs, individual beliefs, and socialized beliefs.

To examine the three dimensions of the question I have raised above, I will consider two recent theoretical proposals in the first part of this article: (1) the notion of plural subject articulated by Margaret

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1. The distinction between belief and acceptance, at least in its modern sense, seems to have first appeared in Van Fraassen (1980) and Stanalker (1984). I'll elaborate on this distinction a little further.

Gilbert (1989, 1996, 2000), which is a kind of revival of holism or supra-individualism in the social sciences, and (2) the notion of polyphonic subject elaborated by Mara Beller (1999) in the history of sciences, which is a way of introducing some ideas supported by George Herbert Mead (1934) or, yet more explicitly, by Cooley (1902) in the United States and Bakhtin ([1929] 1994) in Russia, about the relevance of a level of analysis symmetrical to the former one, an infra-individual level. In the second part of this article, I will consider three different historical examples.

## 1. GENERAL PRINCIPLES

In this first part of my analysis, I would like to set out the general principles of the two symmetrical viewpoints of Margaret Gilbert and Mara Beller, that is, the plural subject and the polyphonic subject accounts of collective and individual beliefs.<sup>2</sup> I will show the relevance of these viewpoints, although I think that the legitimacy of the individualistic level of analysis is not at stake as I will emphasize in the conclusion of this article.

### The Plural Subject Account

Margaret Gilbert's concern is to give an account of what is really social as opposed to individual. However, I think it would be much better to say "collective" for what Margaret Gilbert seems to have in mind and to keep "social" for other aspects. Margaret Gilbert supports the idea that Durkheim is correct, at least to a certain extent, when he says that there are collective entities—besides, Durkheim says "collective"—that are not reducible to individual entities. It is true of subjects. It makes sense to speak of collective subjects and not only of individual subjects, and it is true of beliefs. It also makes sense to speak of collective beliefs and not only of individual beliefs. But unfortunately, Durkheim was very clumsy in setting out this idea, and he encountered a lack of understanding. On the contrary, I take Gilbert's reconstruction as clarifying the point at stake.<sup>3</sup>

2. Margaret Gilbert has recently been discussed more and more in this field. See, for example, Meijers (1999) and Wray (2001). To my knowledge, it is not yet the case of Mara Beller's idea, which is mainly discussed in history and philosophy of sciences. Then one of my goals is especially to put forward Mara Beller's polyphonic account.

3. See especially Gilbert (1994).

There is a kind of minimal collective subject, which Gilbert calls “plural subject,” when even only two people decide to join together to do something. This agreement does not need to be necessarily explicit, although each of the individuals who agree with each other has to be aware that the other agrees with him. It has to be “common knowledge” in Lewis’s sense. The point is that the two people are not only doing something, possibly the same global thing, one next to the other as if their respective actions were just added. They are acting together in such a way that neither of them can decide to stop the common action without being exposed to the reproaches of the other. And if everybody is sincere, everybody will recognize the legitimacy of this reproach.

Margaret Gilbert gives different kinds of examples. The simplest and the most paradigmatic one is two people walking together.<sup>4</sup> They may have not decided to do it. This can be the case of two people who just know each other a little happening upon each other by chance, for example, if they run into each other at a crosswalk on campus, coming from different places but going in the same direction. *If they start to walk together*, they will normally feel a kind of obligation either to adjust their pace or to apologize if they do not, revealing through this apology that they actually feel a kind of obligation to adjust their pace. So, even in such tiny interactions, there is a sort of common aim that emerges very quickly and that exerts pressure in return on each person, even if it may be light. On the contrary, if the two people keep on walking together, Margaret Gilbert calls it “plural subject,” the association of these persons, however brief it might be. And, if I understand Gilbert correctly, I guess we would be allowed to call “collective purpose” the common aim that might have never been planned before this very circumstantial meeting but that emerged from the tacit contract people made in starting to walk together. Had they just said, “Hello,” managing not to walk at exactly the same pace from the beginning, they would not have undertaken such a contract. But now they are jointly committed, and any breaking of this implicit agreement will require some kind of justification.

The plural subject account is more interesting when the stakes are higher and when the people are a little more numerous. Margaret Gilbert takes as an example the scientific communities and collective beliefs that they can share. Even there, it is preferable to start with a very trivial case. Let us suppose (I am freely taking Gilbert’s exam-

4. See Gilbert (1996), chapter 6: “Walking Together: A Paradigmatic Social Phenomenon.”

ple<sup>5</sup>) that in a college at Oxford, dons are discussing the menus at the High Table very informally. One finds there is meat too often and not enough fish. Another adds that above all potatoes are served too often. The third one nods his head. A fourth one seems not to be really interested in the discussion or to only half listen. The last one wants to protest, but she is not heard, and as she is a little intimidated, perhaps because she is younger and new in the college, she does not insist. If at the end (Gilbert continues), the first to speak states, "So, we are not really satisfied with the menus and we ought to complain," is he not really entitled to say "we" as he did and to think that he is expressing not only his personal opinion but the opinion of the whole group, though *every* person did not personally agree with this opinion? I am commenting on Gilbert's account by adding that for the person who personally disagreed but did not state it, there are two different opinions in her mind, a personal opinion and a collective opinion, and she is committed to the second one, even if it is in a certain sense in spite of her. She is now part of the group of discontented people. She is (jointly) committed to an opinion that not only she did not set out but even that she fundamentally disagrees with.

If we consider a similar group of professors, doctors, and postgraduate students now discussing scientific or philosophical topics, a very similar situation may happen.<sup>6</sup> If they are members of a team working on a controversial topic in the scientific community, for example finding an AIDS vaccine, one of the members might disagree not only with the conceptions of somebody else but on the collective opinion of the group, that is, the opinion that they would collectively support at an international conference. But it may be hard for her, especially, for example, if she is still a graduate student not having finished her Ph.D., to express her disagreement, at least in front of the whole group, a fortiori in an international conference before many other people, some of them supporting a completely opposite view to her team's. What is important again here is the clear difference that can be made between individual beliefs and group or collective beliefs, and especially the fact that each person can feel himself or herself socially or morally committed (I am not concerned here with this distinction) to the collective beliefs to the extent that he or she does not want to leave the group.

5. See Gilbert (1994, 100-101).

6. See, for example, Gilbert (2000), chapter 3: "Collective Belief and Scientific Change."

Gilbert's analysis might need here some more clarifications or complementary comments. Especially important for my purpose are the following points: (1) First, Gilbert makes an important distinction between two kinds of beliefs—one of them individual belief, which is close to what most of the philosophers seem to properly call belief, and another kind of beliefs, collective beliefs, which are not beliefs in the proper sense but are not exactly or not only *acceptance* in the recent technical use of this word. Acceptance, in this sense, notably involves a kind of voluntary assent, which is absent of the proper belief.<sup>7</sup> But collective beliefs—or the collective beliefs Margaret Gilbert envisages—are not only accepted in this sense, though no more believed, since Margaret Gilbert greatly emphasizes the fact that people are committed to them and more precisely *jointly* committed to them.<sup>8</sup> (2) But second, Margaret Gilbert does not make any distinction between simple interpersonal joint commitment and institutional joint commitment in which there are official sanctions for those who break the tacit agreement. However, most of the collective beliefs that social scientists have in mind are supported by institutions, for example, in Western countries by the Catholic Church or Muslim authorities. It also can be a scientific community. (3) Eventually, Margaret Gilbert does not make a real difference between individuals who freely agree and those who agree while being forced in a certain sense since they would have preferred not to be committed themselves. Such an issue

7. One cannot decide to believe or not believe something. It is just a fact that happens, but one can accept it in the sense, for example, that one takes a statement for granted. There would be many psychological stances to distinguish here (see, for example, Engel 1998, 1999). But they do not really matter for the main focus of the present article. Further to some critiques (Meijers 1999; Wray 2001) which contended that Gilbert was actually speaking of acceptances, Gilbert (2002) maintained her viewpoint. As it is, as she stated herself, partly a terminological issue, I will not examine this point at length. It is sufficient here to say that referred to the voluntarist criterion I have retained, the "beliefs" of which she speaks are clearly cases of acceptance. One even must add that one aspect of acceptance Van Fraassen (1980, 1984) noticed and Engel (1998) emphasized—that one can accept something in spite of one's genuine belief—is especially present in Gilbert's collective beliefs.

8. The idea of commitment is indeed more or less explicitly involved in the technical notion of acceptance, but most of the time there is no emphasis on it or on the idea of obligation that is linked to the idea of commitment. The idea of commitment in reasoning was put forward, on the contrary, in argumentation theory since Hamblin (1970). It was developed at length by Walton and Krabbe (1995), who have more precisely spoken, in these cases, of "propositional commitment" but without, however, constructing any relation with the notion of acceptance and all the literature about belief and acceptance.

would lead to ask whether the nature of commitment is only social or also moral.

### The Polyphonic or Echoic Subject Account

Classical sociologists who were interested in the analysis of interaction between individuals as sources of the social phenomena directed their insight mainly into two directions. Simmel (1908, 1971), like Margaret Gilbert after him, tried to show how even the smallest interactions can produce a social level to some extent not reducible to individuals (what I have called the collective level), of which Gilbert's notion of joint commitment seems to me to give the central account. But George Herbert Mead (1934) and before him the social psychologist Cooley (1902) tried to examine the relevance of another idea, that individuals are to some extent the reflection of other people. Cooley forged the idea of the "looking-glass self" to express this idea. A related idea has been supported in a more specific area, the theory of literature, by the Russian Bakhtin ([1929] 1994). The analysis does not concern the self but only the discourse that the self can express. But just as the self can be the mirror of other selves, the discourse can also be the "echo" of other discourses. One can also say that the discourse expresses the others' voices; thus, in a certain sense, the discourse is or can be "polyphonic." Bakhtin studied only literary texts, especially Dostoevsky's novels and Rabelais's work, giving various extensions to this general idea. Most of the time Bakhtin ([1965] 1968) was only thinking of fictional voices and the polyphony was only that of fictional characters. But not always since; for example, in his book on Rabelais, he contended that this had expressed the people's voice, including their colorful and slangy language. It is in this more sociological sense, very close to Cooley's looking-glass self, in fact, that Mara Beller (1999) uses the notion of polyphony.<sup>9</sup> But she uses it in a sense that sheds sharp light on the social aspects of science, though differently than Margaret Gilbert since her way of thinking is much more inductive, taking as her starting point a long examination of the Copenhagen School in Quantum Mechanics. She tries also to describe all the particularities of the intellectual relations between the different members of the group, dealing with the theoretical question of socialized beliefs in their relation to individual beliefs only at the end of her

9. See Beller (1999), chapter 15, "Dialogical Philosophy and Historiography: A Tentative Outline," especially pp. 323-25.

study and only in the context of a discussion on the nature of scientific paradigms and the place of controversies in science.<sup>10</sup>

What can be drawn from the historical analysis provided by Mara Beller is a model with different aspects, some of them very simple and even trivial when taken in isolation, some others more refined. (1) The most elaborate thought, expressing the most personal belief, might have emerged through various discussions with other people. It is always dialogical to some extent. I will add here that thought is social or socialized—even if it is deeply personal—avoiding the word *collective*, which I am keeping for the specific contexts that Margaret Gilbert gives a clear account of. Beller (1999) takes the example of Heisenberg's paper on uncertainty in 1927,<sup>11</sup> which I will soon come back to. (2) However, there are strong differences as to the intensity of the dialogicity and the number of people participating in this dialogicity. (3) The real role of every participant in the former discussions is not always expressed in the published text. The tendency is rather to make the text more monological than it was. Heisenberg is again paradigmatic of these two latter aspects.

Some other aspects of Beller's model are especially interesting for the question of the relations between individual and collective beliefs. Thus some texts, even scientific texts, are so polyphonic, even if it is not explicit, that they are logically incoherent. These kinds of texts have a special function in science. They can express the collective belief of a group and not necessarily the beliefs of any individual. According to Beller, Niels Bohr's lecture in Como is very representative of this case.<sup>12</sup> If this is the case, we have a complex historical exam-

10. As Beller (1999, 308-12) also much emphasized, she gives an alternative—and in my opinion much deeper—description of social construction of knowledge than relativist “social constructivism” gave and in which negotiation is the main kind of cognitive interaction. This polyphonic (or echoic) model also could balance the current “distributed model” of cognition since this model envisages how cognition and knowledge are sometimes distributed among many people (and sometimes artifacts as well) but in such a way that nobody has the entire information and not everyone communicates with every other person (see Giere 2002). One of the most convincing examples of the relevance of this model was given by Hutchins (1995) in his study of ship navigation when U.S. Navy ships are coming into port. Hutchins shows how information about the location of the ship is shared among many people (through various technical devices such as gyrocompasses and charts), sailors on each side of the ship, navigator, pilot, and so forth.

11. See Beller (1999), chapter 4: “The Dialogical Emergence of Heisenberg's Uncertainty Paper,” and chapter 5: “The Polyphony of Heisenberg's Uncertainty Paper.”

12. See Beller (1999), especially chapter 6: “The Dialogical Birth of Bohr's Complementarity.”



ple of a *collective* belief clearly different from individual beliefs, exactly like in Gilbert's model of the Oxford dons but expressing at the same time a mixture of all the individual beliefs of the members of the group. Gilbert's model of the Oxford dons did not anticipate this aspect. Much more complicated cases must be imagined as to the relation between individual, socialized, and collective beliefs (in Gilbert's sense) when one tests these models with effective cases in historical contexts.

## 2. PARTICULAR PRINCIPLES AND CASE STUDIES

In this second part of this article, I will present some historical examples to evaluate the relevance of the former general distinctions and to show that others are needed. They will be borrowed from the history of science and the history of philosophy, with a special focus on the latter because it is often thought that the proper aim of philosophizing is to draw out oneself from what has been thought by other people and to only give one's assent to what one has thought of by oneself. The proper aim of philosophy makes more difficult any analysis of its social and a fortiori collective part—if it exists—and therefore represents a more interesting challenge.

My first example, more briefly examined than the others because it is less rich, is just borrowed from philosophy. Actually, contrary to what it seems at first sight, even in philosophy, there are probably collective beliefs in Gilbert's sense and plural subject in Gilbert's sense as well since from Plato's *Academy* to the Frankfurt School, there have been many groups of philosophers. One of the clearest and simplest examples of the philosophical plural subject is the Vienna Circle. In this case, actually, different philosophers (Hahn, Neurath, and Carnap) jointly committed themselves to support some ideas in a brochure titled "*Wissenschaftliche Weltauffassung: der Wienerkreis*" (The Scientific Conception of the World: Vienna Circle), published in 1929. The bibliography mentioned at the end of the brochure gives the names of all the members—there were 14—among whom were Herbert Feigl, Kurt Gödel, Moritz Schlick, and Friedrich Waisman. Each of them committed himself to supporting the ideas expressed in this brochure. In this sense, they can be said to constitute a plural subject in Gilbert's sense since they necessarily felt some kind of social or even moral obligation to publicly support the ideas expressed in this booklet. The collective aim of this group—that is the intention of not

insisting on their particularities—was even set forth at the very beginning of the text. They even asserted they wanted to participate in the group as simple members of a body: “Every individual strives to merge into the group.”

However, in this case, the collective ideas expressed in the brochure are so general and vague that there is no strong reason to think that this brochure expresses any idea that is not shared at the same time by *every* member of the circle. Thus, in this case the collective belief of the group is just what they believe in common, which is surely a small part of every individual belief. And it is just to that extent that the collective belief is different from the individual beliefs as to its content. Then the case is even simpler than Gilbert’s case of the Oxford College dons since everybody seems to completely agree with the common ideas expressed and signed by only some of them (Hahn, Neurath, and Carnap).

What is different for each member of the Vienna Circle compared to people not belonging to it—for example, Ramsey or Reichenbach, who are mentioned at the end of the brochure as being close to the circle, even grounding their works on the same scientific conception, but not members of it—is that a member of the circle cannot abandon these shared ideas as freely then as is the case for his more personal beliefs since he is now committed to the other members as to the ideas expressed in the brochure.<sup>13</sup>

In this case, it is also clear that the word *acceptance* does not fit very well, even in its recent technical acceptations or that one would have to introduce new kinds of acceptance. In the common sense of the term like in the technical sense, a voluntarist dimension is involved. One could accept or refuse a gift or an invitation, for example, like one could accept or refuse a hypothesis. It is true that in the latter case, there is more emphasis on the activity involved in acceptance since in the paradigmatic example of acceptance it is the same mathematician who imagines and who accepts the hypothesis that he takes for granted just for the sake of his demonstration. But there is a difference

13. Strictly speaking, Gilbert’s model is not sufficient here to make a satisfying account of this case because the external publicity of a joint commitment (as it is the case in a manifesto) is not necessarily at all apart from those who commit themselves. Thus, one should add that Ramsey, Reichenbach, and some others were surely members of the informal Vienna Circle that, as is well known, preceded the manifesto and therefore were part of the plural subject it constituted. The external publicity of the commitment—that is, the publicity of the commitment relative to those who are not committed to this plural subject—surely adds something specific to the joint commitment, but the plural subject model itself cannot explain it.

between taking a hypothesis for granted and claiming it or claiming some general principles,<sup>14</sup> a fortiori in the very public way of a manifesto—as was the case in the Vienna Circle example, in which the signatories claimed positivist principles and were actively involved in their defense and promotion. It does not mean, however, that they “believed” in them if one thinks that belief—in the narrow sense we have retained—is involuntary. But the point is that even if each of them really “believed” in the positivist viewpoint—as far as believing in very general and vague principles makes sense—they were jointly committed to support it from the time they had contracted together (had they done it only implicitly).

The second example of “plural subject” I envisage is more interesting because it puts forward much more clearly the relevance of the distinction between individual beliefs and collective beliefs in Gilbert’s sense. It is the example of the Copenhagen School in Quantum Mechanics. I am borrowing this from Mara Beller, but I am now focusing on some aspects that are better revealed if one uses Gilbert’s concepts as well. The Copenhagen School was not a circle in the sense of the Vienna Circle. They did not publish a manifesto or draw up the list of the members of the school. And what is clear is that the various physicists who worked together at Copenhagen on quantum mechanics or who regularly came to Copenhagen to have discussions on this topic had very different ideas on many points. Some historians of physics even state that there was no Copenhagen School at all if one means through this expression that they shared some common conceptions. If it was the case—and maybe their conceptions have only “family resemblance”—these common assumptions were too narrow to identify this group from other rival groups.

I contend that the distinction that Margaret Gilbert makes between individual and collective beliefs in the specific sense she gave to this latter notion enlightens this problem. In which sense was there a Copenhagen School, and did they have collective beliefs? In fact, if there was not an official manifesto of the physicists like in the Vienna Circle example, a paper given by Niels Bohr in Como in Italy in 1927 played a very similar role. Obviously, according to Mara Beller (1999), Bohr was not expressing only his own opinions, or even mainly his own opinions, but, on the contrary, tried to put forward a unified conception of physicists working on quantum mechanics at Copenha-

14. It is even more than asserting, although asserting involves a greater degree of will than only taking for granted (see, for example, Engel 1998).

gen.<sup>15</sup> The differences with Heisenberg's positions were, for example, "subdued" (p. 143),<sup>16</sup> and in the version published in *Nature*, he emphasized the proximity with Pauli's ideas (p. 142). At the same time, Bohr glossed over the points he personally agreed with in Schrödinger's conceptions (p. 142) because in Como the Copenhagen physicists wanted to appear unified against Schrödinger's rival school. Moreover, Beller says that the original version of the Como lecture was not written by Bohr alone but with Klein's and Darwin's assistance (p. 142). A result of this intention to give a unified conception is that Bohr's lecture in Como is, according to all historians of physics, especially obscure, because it lacks logical consistency.<sup>17</sup> Nevertheless, even if Heisenberg, Pauli, Dirac, and Bohr strongly disagreed with each other in private or in their letters,<sup>18</sup> they never publicly aired their disagreements with Bohr's lecture in Como.<sup>19</sup> Thus,

15. She wrote, "The orthodox [the Copenhagen School as opposed to opponents like Schrödinger] aimed to present a united front to the opposition, concealing the substantial differences of approach among its members" (Beller 1999, 10). And then, "The united public front did not imply that the Copenhagen interpretation was coherent or consistent. The 'interpretation' was actually an amalgamation of the different views of Bohr, Born, Heisenberg, Pauli, and Dirac" (Beller 1999, 143).

16. "The need to offer a unified explanation, capable of countering the opposition, was one of the reasons for the obscurity of Bohr's lecture, in which the differences between Bohr's and Heisenberg's positions were subdued" (Beller 1999, 143). Mara Beller (1999) said at the very beginning of this chapter that "the usual reading of Bohr's paper assumes the similarity of Bohr's and Heisenberg's positions, while a dialogical analysis reveals an incompatibility between their positions at the time" (pp. 118-19).

17. According to Beller (1999), only the dialogical hypothesis enlightens the text: "Without identifying the interlocutors of each sentence of the Como lecture, it is impossible to understand the meaning of these sentences and the connections among them" (p. 120). To be true, Beller's thesis that the lack of consistency of the Como lecture is the cause of its obscurity has been challenged. Some others think that its relative confusion comes from the use of metaphors and ambiguities, but those are just the mark of the thought formation process. See, for example, Chevalley (1988).

18. This is partly the subject of chapter 6 of Beller (1999). A few pages are devoted to the "Clash with Heisenberg" (pp. 138-41)—Beller says that "a dialogical reading of Bohr's Como lecture also provides a new perspective on the famous clash between Heisenberg and Bohr over the uncertainty paper" (p. 118)—and few others to the "confrontation with Pauli" (pp. 141-43). The beginning of the chapter is dedicated to the dialogue with physicists who did not belong to the Copenhagen School ("Dialogue with Schrödinger," pp. 122-31; "Dialogue with Einstein and Compton," pp. 131-35; and "Dialogue with Campbell," pp. 135-38). It would be too long and it is not necessary for our purpose to present the effective content of these discussions.

19. "Both Heisenberg and Pauli supported Bohr's philosophy of wave-particle complementarity in public while often expressing, behind closed doors, views that were contrary to Bohr's" (Beller 1999, 12).

we have here a very interesting example of what Gilbert calls a “plural subject” since Bohr, Heisenberg, Pauli, and Dirac were willy-nilly jointly committed to the ideas expressed by Bohr in Como and then in *Nature*. In this example, there is a clear difference between the collective beliefs expressed by Bohr and the individual beliefs of each of the people committed to the collective beliefs.

Moreover, this case is paradigmatic of two interesting aspects at least. First, the collective belief does not fit any individual belief, not even Bohr’s belief since Bohr had to make concessions and therefore not express his most private thought clearly.<sup>20</sup> Second, in any case, since the collective belief is unintelligible to some extent, according to most historians of science, it might not be the real belief of anybody if one admits that understanding is needed to believe something in a proper sense.

Can we say that Heisenberg, Dirac, Pauli, and even Bohr only accepted what they could not really believe and that it would be more appropriate to speak of collective *acceptance*, which would mean that they assented to something (even if it was willy-nilly), without however genuinely believing it? It is true that it is only in a very general sense that we can speak of beliefs here and that it is not at all a belief in the proper sense. It is true, consequently, that the relation of Heisenberg, Pauli, Dirac, and, a fortiori, Bohr to the Como lecture could be designated as a relation of “acceptance” in the technical

20. One needs to quote this whole passage—which besides suggests what was one of the deepest theoretical disagreements between Bohr and Heisenberg and how Bohr was trying to express both his own beliefs and what he would have liked to be the collective beliefs of the Copenhagen School (or rather their *acceptances*, so far as this word is satisfying).

Bohr’s defense and elaboration of the idea that an atomic system is adequately represented by a sequence of stationary states that are, in turn, adequately described by Schrödinger’s wave function reveals a deep conceptual gap between Bohr’s wave theoretical and Heisenberg’s particle-kinematic interpretations of atomic systems—a gap that was circumvented rather than resolved by subsequent developments. This incompatibility between the positions of Bohr and Heisenberg is one of the historical roots of the inconsistencies that plague the Copenhagen interpretation of physics. My discussion of this gap also provides an insight into Einstein’s and Schrödinger’s early dissatisfaction with the Copenhagen interpretation. I argue that their initial criticism focused on the inconsistency of amalgamating the incompatible positions held by Bohr and Heisenberg. Part of the incomprehensibility of the Como lecture derives from Bohr’s attempt to conceal this gap by uniting forces against the opposition. (Beller 1999, 122)

sense (they accepted the ideas of the Bohr lecture *in spite of* their own genuine beliefs; see n. 7). But, on the other hand, it is clear that they were, however, committed to actively support and defend this collective belief (“belief” in the broad sense), which means a kind of activity and determination much more important than what is generally meant by “acceptance” in the recent literature.

One might at first sight think that this analysis of Copenhagen School is directly opposed to Beller’s (1999), as for Heisenberg, at least, since she states that “Heisenberg theorized without a clearly delineated conceptual framework, without ‘belief’ and ‘commitments’” (p. 5). But what Beller has in mind is the fact that Heisenberg was not committed to any specific paradigmatic intellectual framework in the construction of his ideas; he was able even to borrow from opposing schools like Schrödinger’s. However, one must point out that one of the main points of Beller’s book is to suggest an alternative to the Kuhnian or post-Kuhnian history of science: “My exposition differs from the usual accounts by describing the flux of ideas without presupposing underlying conceptual frameworks, schemes or paradigms. . . . Living in doubt and uncertainty is not compatible with the accepted historiographical notions of ‘beliefs’ and ‘commitments.’ Nor are Kuhnian and post-Kuhnian ‘agreement’ and ‘consensus’ suitable to describe the dynamics of living without knowing. . . . From the dialogical perspective, it is ‘creative disagreement’—with oneself (doubt) or with others (lack of consensus)—that plays the crucial role in the advance of knowledge” (p. 3). Beller comes back to these themes at the end of her book: “The notions of ‘belief’ and ‘commitment’ are . . . problematic. . . . We have to dissociate the idea of devotion to one’s work from that of belief, perseverance from commitment, cooperation from consensus, trust from conformism” (p. 311).

But this viewpoint is not incompatible with the idea that Heisenberg, like each member of the so-called Copenhagen School, was willy-nilly (publicly) committed to the ideas expressed in the Como lecture. Moreover, Beller (1999) herself shows that the dialogical structure of Heisenberg’s and Bohr’s ideas was later veiled by what she calls the “rhetorical consolidation” to which she devotes the whole second part of her book (chap. 8-15). She even adds that Bohr’s work became more and more worshipped as a hero at that time (chap. 13, “Hero Worship, Construction of Paradigms, and Opposition”) and indicates “how Bohr’s authority promoted uncritical acceptance of the Copenhagen philosophy” (p. 270) and how the

physicists “who dared to challenge” Bohr experienced “overwhelming guilt” (p. 274).<sup>21</sup>

But Beller’s case also brings clarification of what is individual and what is social in beliefs. Actually, in the Vienna Circle example, it is not easy to detect what might have originated with each of the contributors, Hahn, Neurath, and Carnap (or other authors like Schlick himself, to whom the manifesto was dedicated). Their different voices were unified in such a way that it is not easy—though surely not completely impossible—to recognize their personal contribution. But in the Como lecture, because of the relative inconsistency of the text, it is much easier. Thus, in the Como case, the social origin of the text is visible, in the sense that several authors have obviously their own voices or part of their own voices expressed in it. The Vienna brochure is surely socially marked as well, but this social origin is less visible.

Now, the social aspect of a belief is not reserved for collective beliefs in Gilbert’s sense, which is a special kind of socialized beliefs. Beller herself offers a brilliant example of an individual belief deeply marked by interactions with other scientists, though not expressing a collective belief in Gilbert’s sense. This is the case of Heisenberg’s paper on uncertainty published in 1927.<sup>22</sup> This paper is very consistent logically speaking and is set out as expressing only Heisenberg’s ideas. However, we know from his letters that the conception of this paper was achieved in a very dialogical way, since Heisenberg discussed it with Pauli, Dirac, as well as with opponents such as Schrödinger and with lesser scientists such as Campbell and Sentfleben.<sup>23</sup> And it can be said that Heisenberg’s paper is very polyphonic because Heisenberg really drew ideas from these dialogues, so that others’ voices were really present, though implicitly, in his paper, even if the proper construction of the ideas are Heisenberg’s. Thus, his personal beliefs have a social origin given that interactions are socialization.

21. Note that this “late period” situation is very close to what Gilbert describes when in a group somebody who is intimidated does not dare to express his or her disagreement with regard to the idea expressed by a leader. Again, one needs to distinguish this kind of *acceptance* (it is the very term used by Beller) from the acceptance involved in the act of taking for granted a statement only for the sake of an argument, which is the paradigmatic example in the epistemological literature on belief and acceptance.

22. See Beller (1999, chap. 4, 5).

23. See the content of Beller (1999), chapter 4: “Dialogue with Schrödinger,” pp. 67-79; “Dialogue with Pauli,” pp. 79-85; “Dialogue with Dirac,” pp. 85-91; “Dialogue with Jordan,” pp. 91-96; “Dialogue with ‘Lesser’ Scientists,” pp. 96-101.



This analysis can be carried further. Thus, all the personal or individual beliefs are not as dialogical and polyphonic as the beliefs included in Heisenberg's paper; I will soon take an example of this kind. Second, the sociality of the belief is sometimes not recognized very clearly or very fairly by the author who benefited from it. Thus, Heisenberg, according to Beller, quoted the most important scientists in his paper but not Campbell, or Sentfleben, or many others, though they sometimes contributed in some nodal points to the formation of Heisenberg's ideas.<sup>24</sup>

My third and last example is borrowed from the history of philosophy again. But I will choose a very different period, in which there were many more collective beliefs in Durkheim's sense. In fact, Durkheim emphasized the constraint that collective beliefs exert on individuals without considering (like Margaret Gilbert) whether these constraints are chosen by the people to a certain extent. And I will consider a philosopher who paradigmatically wanted to draw from these collective beliefs or is perceived as such, Descartes.

To examine this example, I will take as my starting point Beller's model applied to the Heisenberg case. The first question is to consider whether Descartes was as dialogical and polyphonic as Heisenberg and whether his thoughts were marked by discussion with others. The reply is not as simple as it might seem at first sight. Of course, Descartes was a solitary thinker, trying to escape as much as he could from social life. But on one hand, Heisenberg (like Bohr) was also renowned for seeking solitude when he was writing, especially, for example, his paper on uncertainty, although it was most of the time after having discussed at length with Bohr, Pauli, or other physicists. On the other hand, Descartes himself carried on a very extensive correspondence with other physicists, mathematicians, theologians, and philosophers, notably thanks to Father Mersenne who was a kind of gatekeeper between different people. It is sometimes said, as in Randall Collins's sociology of philosophy, that Mersenne was the center of a circle, but it is only in the sense that there was a network linking different people (Collins 1998, chap. 10). There was not a circle in

24. "The names Zernike and Ising do not appear in the usual historical works dealing with the genesis of Heisenberg's uncertainty principle. Nor we find the names Duane, Campbell, or Sentfleben. Yet all these scientists had prominent places within the dialogical web that formed as Heisenberg groped towards the formulation of the Uncertainty Principle. By burying such names in the annals of history, the usual accounts suppress the dialogical nature of reasoning and enhance the 'hero worship' tradition" (Beller 1999, 96).



the Vienna sense or even in the Copenhagen School's sense, that is, the feeling of constituting a plural subject committed to collective ideas.

The real problem here is to know to what extent Cartesian philosophy was polyphonic, that is, incorporated others' viewpoints and, in that sense, was socialized thought. Was this very original thought that claimed to be constructed by a personal progression socially marked? There is not a simple reply to this question. One must first recall that *Meditations* were not published alone but with six series of *Objections* followed by Descartes's *Responses* and that *Meditations* themselves are only a rather small part of this whole.<sup>25</sup> But, according to most scholars, it is also true that most of the time this series is a little disappointing because neither the authors of the *Objections* nor Descartes himself really seems to try to deeply understand the point of the other (with a notable exception of Arnauld).<sup>26</sup> Thus, most of this collection, including later *Objections*, is only slightly polyphonic, even if there was a dialogue. But in other cases, as when Descartes was writing the *Treatise on Passions* (*Traité des Passions*), it was clear that Descartes (1989) was deeply influenced by previous and contemporary discussions with Princess Elizabeth, from which *Letters* have been kept, so that a recent commentator, Jean-Marie Beyssade (1989), could claim that the *Treatise* and the *Letters* are "two twin works" ("deux œuvres jumelles") (p. 29) and that "each letter, even signed only by Descartes, has actually two authors" (p. 29). Thus, Beyssade, who stated that the *Letters* is a "two-voice work" ("ensemble à deux voix") (p. 35), could have said the same of the *Treatise* itself.<sup>27</sup> Nevertheless, like the "lesser scientists" in Heisenberg's paper, the name of Elizabeth, who was not a renowned philosopher at all but just a clever young woman, is not mentioned in the *Treatise*.<sup>28</sup>

25. The dialogical aspect of this whole is emphasized in Beyssade and Marion (1994).

26. It is one point that clearly appears in Green and Ariew (1994). See especially Roger Ariew's article, "Pierre Bourdin and the Seventh Objections."

27. The *Treatise* itself has emerged through this correspondence as the *Letters* with Elizabeth clearly reveal.

28. Actually, Descartes very officially dedicated another work, the *Principia philosophiae* (1644) to Princess Elizabeth, whom he corresponded regularly with from May 1643, but there is not any of Elizabeth's influence at all in the *Principia*, and in any case, homage is not an acknowledgment of a debt. The case of Princess Elizabeth could be a paradigmatic example for feminist epistemology (see, for example, Wylie 2000) less because Descartes did not mention her name—since Descartes was always very sparing with acknowledgments of debts, and his relations with the mathematician Isaac Beeckman are famous in that respect—but because her marginalized intellectual position seems to have left her much more open minded than everybody else. She is

But Descartes's *Meditations* themselves, in isolation from *Objections* and *Responses*, are nevertheless polyphonic, and in a sense that deserves consideration as to the general problem we are now concerned with. There is a first polyphonic dimension in *Meditations* at their very beginning. As everybody knows, Descartes introduced many reasons for doubting in the first *Meditations*, and eventually, he proved able to conclude, at least, I exist as the subject of this doubt, "Je suis, j'existe." If we have a look at the reasons he invoked, it is clear that he could not believe at the moment he wrote *Meditations* that these reasons were strong ones. For example, Descartes here seems to think that senses are sources of errors. However, every good student in philosophy, even in Descartes's time, knows that this can be said only from a very simplistic point of view. Since Epicurus at least, one knows that intellect is involved in the source of errors, even when they seem to only come from senses. Moreover, Descartes showed further (in the fourth *Meditation*) that he thought the will also was always involved in error.<sup>29</sup> Thus, one can interpret this part of *Meditations* as expressing a voice that is not Descartes's voice, at least at the moment he wrote *Meditations* (around 1640), since he had experienced similar thoughts years before (around 1629-30, according to his correspondence), and he had already published the story of his mind some years before in *Discourse on Method*. But whose voice is it? It is surely not the people's voice here, like in Rabelais's novel according to Bakhtin's interpretation, even if such a voice is also present, since common people do not doubt senses but, on the contrary, believe that knowledge comes from senses.<sup>30</sup> This voice is the voice of beginners in philosophy.

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reputed to have been the one and only person Descartes had an authentic intellectual dialogical relationship with (Beysade 1989).

29. Thus, in modern terms, Descartes would support the idea that true belief needs to be clearly recognized and besides accepted through an act of the will. True belief, in this sense, like error, needs acceptance. See Cohen (1992, 1-2).

30. Thus, Descartes is also the spokesman of these when he says at the very beginning of *Meditations*, "Tout ce que j'ai reçu jusqu'à présent pour le plus vrai et assuré, je l'ai appris des sens ou par les sens" (*Meditation* 1). Another expression of this voice is visible through the famous controversy between Michel Foucault and Jacques Derrida about the effective "author" of the following statement in the first *Meditation*: "Mais quoi? Ce sont des fous et je ne serais pas moins extravagant si je me réglais sur leurs exemples." Although it was not Derrida's main point at all, one must admit that Derrida (1967) here shows very convincingly—contrary to Foucault's interpretation (Foucault 1961)—that Descartes doesn't express his proper belief but just echoes the objection that leads a priori to expelling madmen from the persons able to reason ("Descartes se fait l'écho de cette objection," p. 78). Such an objection comes from the general

The first pages of *Meditations* would need much more consideration,<sup>31</sup> but the previous remarks are sufficient to suggest that voices other than Descartes's are present at the beginning of *Meditations* and that one needs to distinguish several voices: the voice of Descartes writing *Meditations*, the voice of a beginner in philosophy, and people's voices. But these other voices are also Descartes's own past voices.<sup>32</sup> Thus, one could contend that there is a dialogue between at least *three* Cartesian selves, Descartes's present self, and Descartes's past selves (as a part of the common people and as a beginner in philosophy). Nevertheless, it will not make sense to try to identify all these voices more precisely, like in Heisenberg's case, because Descartes obviously did not try to reply to effective historical questions, contrary to Heisenberg. One knows that he wanted to refute the new Skeptics, but he did not try to formulate their proper arguments, for example, those of the "Libertins érudits."<sup>33</sup> He rather chose some more or less traditional and more or less acceptable arguments (such as madness and dreams) by various audiences and invented new arguments and—according to him and to many others—stronger ones than those they had ever expressed, like the hypothesis of a deceptive God.<sup>34</sup>

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common opinion in the 17th century much more closed to madmen than the 16th-century general opinion that Rabelais expressed. In the 17th century, people who were not philosophers did not want to seriously consider the hypothesis they might be mad, but Descartes did. However, as he wanted to be understood by beginners in philosophy, he imagined another hypothesis that had the same intellectual content but that could not be rejected so easily—the hypothesis that one might dream.

31. I have done this in some papers, and Bouvier (1995) is entirely devoted to Descartes's case.

32. Beller (1999) just evokes such a psychological use of the dialogical model when she writes about the uncertainty paper: "We clearly discern there many conflicting voices, including Heisenberg's own past voice" (p. 115).

33. It is the name given to a group of Skeptics at the beginning of the 17th century, like Gabriel Naudé, François de La Mothe Vayer, Isaac de la Peyrère, and Gassendi himself (Popkin 1979, chap. 5).

34. And Descartes did it so much that these arguments seemed to many people even stronger than the refutations he contended to give. According to Father Bourdin, Voetius, and Schook, who attacked Descartes on this point, it was as if his proper voice appeared weaker than the skeptic voice (Popkin 1979, chap. 10) or even as if he were endorsing the skeptic voice. Note that one can say that Descartes only accepted these hypotheses in the sense that he took them for granted only for the sake of his argument, but the polyphonic model reveals how these assumptions may have historical or quasi-historical authors and for whom these are not only acceptances but beliefs.

Thus, the structure of the first *Meditation* is polyphonic or *echoic*<sup>35</sup> and, to a certain extent, ironic since the *cogito* itself was drawn from this echoic skeptic departure. But does it mean that *people's common opinions* from which Descartes starts and sometimes discusses in *Meditations* are collective beliefs in Gilbert's sense? Surely not for some of them at least. Common people were not jointly committed to believe that knowledge comes from the senses and probably no more that madmen cannot reason at all. They did not "accept" that in the technical (voluntarist) sense of the term. Most just believed that and probably everybody did before having especially thought of that. So it was rather a very common *tacit belief*, which means that many individuals had the same thought. One cannot even say that it was a socialized belief in the sense I used above because it did not need to have been constructed through interactions with other individuals. Very probably it was just a spontaneous belief. So the belief that senses are the source of knowledge at least is just a very *widespread individual belief*, and surely Descartes wanted to drag people away from it, but it was very different from a collective belief in Gilbert's sense.<sup>36</sup>

As to the belief that God can deceive, the case is more complicated but again interesting for our concerns. It is a dogma in Christianity that God is good. Thus, the question would be to know if any good person can lie. It can be upheld that lying is always bad, as Kant contended, or that, on some occasions, as Benjamin Constant (and before him Leibniz) claimed, it might be better to lie than to tell the truth. Besides, when Descartes set out the different features of God further in *Meditations*, he asserted that God is necessarily good and that he cannot deceive people (*Meditation 4*). The point here is that thinking of God as good is really a collective belief in Gilbert's sense in the 17th century, though the obligation is different from the cases we have seen. For every Christian, to believe that God exists, that God is good and almighty, that there is only one God, and so on is compulsory. And it does not only mean that Christians have to *accept* that, even if they do not understand it very well. It means that they have to publicly affirm they believe in it if they are questioned. To be a Christian is to be ready to publicly state the creed. Thus, Christians do not only

35. Sperber and Wilson (1986) use this term to express an idea very close to polyphony (pp. 237-43). They borrowed it from Ducrot (1984), who set a sophisticated polyphonic model in pragmatics.

36. To be true, the case of madness is more complicated since one can observe that common opinion on it has varied and that the conception of madness is historical (see, for example, Hacking 1999). But this evolution seems to have happened in such a tacit way that there was no real place for a conscious act of acceptance.

have to willy-nilly jointly commit to Christian beliefs as they also do just in doing religious things together with other people, such as walking together to church. They also have to publicly profess it, even before non-Christians and people hostile to Christianity. Gilbert's contractualist model enables analyzing Christianity or, more generally, religious beliefs as collective beliefs. But what Gilbert's analysis does not permit to take into account in itself, however, is that the joint commitment here is not only an interpersonal commitment of which the breaking would cause sanctions only from the other persons as persons or members of the plural subject. Here, there are institutions that are allowed to punish those who break the joint commitment or who do not demonstrate it. Thus, Gilbert's analysis has to be completed to take into account these institutionalized collective beliefs.<sup>37</sup>

Actually, Descartes had to manage more with the idea of God's omnipotence compared to free will. Being sometimes suspected of being a heretic, especially because of his conception of free will, meant that he was perceived as breaking the collective beliefs to which he was committed or threatening to break them. The risk of Descartes being punished for that is obvious when Descartes spoke about free will in *Meditations* compared to what he wrote in more private correspondence.<sup>38</sup> If Descartes did not say anything incompatible with what he said in more private texts, he seems to express a collective belief here to which he is committed without necessarily really believing that it is true. If this analysis is right, this case shows that the expression of an individual belief might be polyphonic yet in a new sense—not in the sense Heisenberg's paper was or in the sense of the beginning of *Meditations* (in which the voice of widespread beliefs and "tacit" beliefs was expressed) but in the sense that institutionalized collective beliefs can be expressed as a "voice" as well. I will add that most of Descartes's interlocutors in the *Objections* did not speak on behalf of themselves but as theologians, members of a religious congregation (such as Arnauld or Bourdin), that is, as representatives again of collective beliefs in Gilbert's sense or similar sense. This does not mean that their own voices were not present as well since all the theologians did not say the same thing but that it was mixed with other voices. And this means that had Descartes's *Responses* been more polyphonic than they were, and therefore more "socialized,"

37. We have also noticed this latest point about the Vienna Circle example.

38. See especially the second letter to Father Mesland on 9 February 1645, in which Descartes upheld the idea that asserting free will is the greatest good.

they would have been an incorporation of individual beliefs mixed with collective beliefs.

On the contrary, it is interesting to note that Descartes did not try to join Hobbes and Gassendi while they were supporters of a new vision of the world, scientifically (but not theologically) more in accordance with which Descartes was introducing. Replying to the *Objections* written by the two of them after the publication of *Meditations*, Descartes did not seek any common ground for their respective thought, even with Gassendi, who made a persistent effort, however, to carry on discussion with Descartes. Thus, the scientific vision of the world that emerged with Galileo was just composed of more and more widespread individual beliefs (Galileo, Descartes, Hobbes, Gassendi, etc.), but it was not at all a collective belief (in Gilbert's sense), even in the scientific community. In any case, Descartes was not a member of such a (scientific) plural subject, as the Vienna Circle was, for example; he was only a node among others in a network. On the other hand, he was publicly committed to the defense of institutionalized collective religious beliefs, which were a kind of plural religious subject.<sup>39</sup>

## CONCLUSION

To conclude, I will quickly sum up the main points of this analysis, adding some comments. I have first claimed a clear distinction between collective beliefs, widespread individual beliefs, and socialized aspects of individual belief, which is not completely set out in Gilbert's analysis. I have also emphasized the aspect of commitment (and more specifically but not only joint commitment) in some kinds of acceptance.

I will add that the contractualist model can probably only partly account for collective beliefs that are already given in a society but to which people have yet to commit, like in the religions in which there are dogmas and therefore an obligation to profess them. Besides the fact noticed above that such collective beliefs are institutionalized, the plural subject account here meets the classical limits of all the contractualist models. These limits are well known in their general aspects from the 19th centuries and the romantic reaction. There is always something artificial in the interpretation of a constraint given

39. See Popkin (1979, chap. 9).

in a society as if it were just the result of a contract. And it is surely a point that Margaret Gilbert missed in Durkheim's conception when she claimed to reconstruct it since, because of the strong resistance of collective facts to the contractualist interpretations, Durkheim very consciously wanted to base their intelligibility on other grounds. Thus, one must concede that resistance is still a challenge to the new contractualist approaches, Gilbert's as well as rational choice's.

Moreover, Gilbert does not deal with the ontological status of the collective beliefs, which was at stake in Durkheim's theory. However, if we adopt methodological individualism, one must think that so-called collective beliefs are nevertheless situated "inside" individuals. They differ from authentic personal beliefs, but they are, however, part of the individual's beliefs. In each individual, there are personal beliefs (or acceptances) and collective beliefs (or acceptances).

But Gilbert's and Beller's accounts raise other general questions to both rational choice theory and methodological individualism. Gilbert's account explicitly introduces the consideration of supra-individual entities (plural subjects, collective beliefs, etc.). Beller symmetrically introduces a kind of infra-individualism in the sense that we need to consider various "speakers" with their own voices inside a writer.<sup>40</sup> If one thinks that each level of analysis is required according to the phenomena at stake, there is not any real difficulty here. The individualistic level is obviously required to explain the formation of joint commitment, and Gilbert does not violate methodological individualism principles since one can always go back from plural subjects (e.g., Vienna Circle and Copenhagen School) to the individuals who constituted it. Symmetrically, what gives unity to a belief expressing various voices is the individual (as in Heisenberg's paper on uncertainty or Descartes's *Meditations*). When this unity is lacking (as in Bohr's Como lecture), there is a lack of intelligibility. This latest case is particularly interesting again if Beller's description is correct since, here, both infra-individualistic and supra-individualistic analyses are required, the former to explain the inconsistencies of Bohr's Como lecture and the latter to describe in which sense Copenhagen School members could nevertheless assent to its content.

In a rational choice perspective, at least two questions have to be raised, which unfortunately I will not be able to answer here. The first one deals with the relation of authority, which is so important in the constitution of the plural subject and which has been observed here

40. For other kinds of infra-individualism, see Bouvier (2002).



even in scientific matters (Bohr's example). To what extent is it rational for individuals to accept such a relation that sometimes seems so contrary to their interests?<sup>41</sup> There are surely pragmatic reasons like those Beller set forth when she spoke of the usefulness of a united front or, more obviously, as those that urged people to accept collective beliefs in the 17th century for fear of sanctions (exile, death, etc.). But to what extent was it really useful for Heisenberg, for example, to veil his proximity with Schrödinger and for Pauli, Dirac, and again Heisenberg to publicly hide their disagreement with Bohr? The reply is not obvious, at least if we add to selfish interests some sort of interest for truth, which seems necessary if one wants to take scientific progress into account.<sup>42</sup>

The second question concerns the exact meaning of the polyphonic or echoic model. Beller uses it to reveal an implicit infra-individualistic structure in some scientific papers. However, in the second part of her book, she shows how the Copenhagen physicists—deliberately, according to her—hid the dialogical (and sometimes conflictual) origin of their thought. Thus, she is supposing a rational strategy in the rhetoric they used.<sup>43</sup> The example of the Como lecture, which did not succeed in persuading at all because the polyphony—and the disagreements among Copenhagen School—was not at all explicit and the unification was lacking, shows that the strategy did not reach its goal and that in this sense it was weakly rational. But in other occasions, the explicit polyphony can be very useful, and it can be chosen as a strategy (Galileo or Descartes himself in *La Recherche de la Vérité*), for example, when one does not want to appear to frankly endorse such or such controversial idea. Yet in other occasions, as in *Meditations*, the polyphonic structure is more or less visible since there is something like an internal dialogue. But in this case, the effect was mitigated because it was not easy for the readers to distinguish the different voices present in Cartesian discourse and because the strongest voice (the skeptical one) was not Descartes's voice at all. What Sperber and Wilson (1986) had in mind when they spoke of the echoic structures was obviously the rational (although more or less uncon-

41. Coleman (1990) provides some precise responses but not on scientific or philosophical matters (chap. 4, 7). On these latest topics, see Goldman (1999).

42. It does not mean a widening of any rational choice theory version but only of those (like James Coleman's) that accept only selfish interest as sources of action. Philosophers like Thomas Reid think, on the contrary, that there is a natural propensity to tell the truth and that we need to introduce in our explanations. See, for example, Alvin Goldman (2002, chap. 8, "Social Routes to Belief and Knowledge."

43. The second part of Beller (1999) is called "Rhetorical Consolidation."



scious) use the speakers can make of them to send a message as to the cognitive expenses such a rhetorical way requires. As the examples we have examined reveal, the effective rationality of the writers is far from the ideal rationality. But the Greeks already knew that rhetoric is like military strategy. And Tolstoy brilliantly demonstrated in his masterpiece *War and Peace* how battles as famous as Borodino were very different from all the plans generals like Napoleon and Koutousov conceived.

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