

---

## 12 What is a collective belief?

André Orléan

CEPREMAP

**Abstract.** This Chapter proposes a new definition of the collective belief of a group, namely what the majority of the members of the group think the collective belief is. Consequently, for an individual  $i$ , to determine what the group believes leads him to reflect on how the other members of the group approach this very same question. This definition is very different from the usual definition, whereby "the group  $G$  believes  $P$ " means simply that the majority of the members of  $G$  believe  $P$ . Three points are demonstrated. Firstly, the notion of salience or focal point developed by Shelling fits this new definition. Secondly, thus defined, group belief is closely dependent on the cultural and historical context that shapes the identity of the group. Thirdly, and this is our main result, group belief defined in this way is disconnected from what agents really believe. Each individual can believe  $P$  and, at the same time, believe that the group believes  $Q$ . This is what we call "the autonomy of group belief".

### 12.1 Introduction

Collective beliefs play an essential role in cognitive economics, through the use of several different concepts. The least strict of these concepts is that of "shared belief" or "first degree shared belief". We say that a proposition  $P$  is a shared belief for a group  $G$  if and only if every member of the group  $G$  believes that  $P$  is true. A shared belief is therefore a collective belief insofar as each member of the group believes the proposition  $P$ , but the definition goes no further than this. Each person believes  $P$ , but they do not know if the others in the group also believe  $P$ . When each person believes  $P$  and also believes that all the others in his group believe  $P$ , we obtain a stricter form of collective belief, known as a "second degree shared belief":  $P$  is a second degree shared belief if and only if it is a first degree shared belief and every member of the group believes it to be such. By repeating this condition, we can obtain an  $n$ th degree shared belief. When  $n$  equals infinity, we obtain what is called a "common belief":  $P$  is a common belief if everyone believes  $P$ , everyone believes that everyone else believes  $P$ , everyone believes that everyone else believes that everyone else believes  $P$ , and so on ad infinitum. This last concept occupies a central position in many situations of coordination.

It can be seen that these different concepts of collective belief all refer back strictly to individual beliefs. They are only collective insofar as all the individuals in one group believe them, in one way or another. They can therefore be differentiated from another concept, which can be expressed in the

form  $CGQ$ : " the group  $G$  believes that the proposition  $Q$  is true ". In the formula  $CGQ$ , contrary to the formula  $CiP$  (which signifies " the individual  $i$  believes that the proposition  $P$  is true "), beliefs are attributed to an abstract entity, namely the group itself. At first sight this notation appears to be absurd. Strictly speaking, the group as such cannot hold a belief, as it is not a human being. For this reason, " group belief " is not a concept used in cognitive economics, which limits itself to a strictly individualist approach. Nevertheless, empirical analysis demonstrates that individuals often make use of this enigmatic type of cognitive object to determine their actions in numerous coordinative contexts. A particularly good illustration is provided by stock markets, in which investors frequently make decisions based on their anticipation of the future behavior of the " market ", considered as an autonomous entity. We thus observe individual beliefs relating to propositions of the type: " the market believes that shares are under-valued ".

One way of approaching this type of belief immediately comes to mind. It consists in saying that an individual believes that the group  $G$  believes a certain proposition  $P$  insofar as he believes that the majority of individuals in the group  $G$  believe  $P$ . We will denote this definition (d1). In the sense of (d1), " group belief " is simply a way of saying that the majority of individuals in the group believe a certain proposition. Certainly, this definition has the advantage of being simple. In addition, it is consonant with the use made of the phrase " group belief " in many situations. However, in the present chapter we are going to study another definition of " group belief ". The definition we propose is certainly more complex, but it is essential for studying certain structures of interaction, particularly financial markets. According to this definition, which we shall denote (d2), an individual  $i$  believes that the group  $G$  believes the proposition  $Q$  if he believes that, in the majority, the members of the group believe that the group  $G$  believes  $Q$ . In other words, we have  $CiCGQ$  if and only if  $CiCjCGQ$  for a majority of individuals  $j$  of the group  $G$ . The definition (d2) is " self-referential ", because, unlike the definition (d1), it does not involve any reference to the " primary beliefs " of individuals (in other words individual beliefs concerning the intrinsic significance of the proposition  $P$ ), but only refers to beliefs that bear directly on what the group  $G$  believes. If we return to our example of an individual  $i$  who believes that the market believes that shares are under-valued, we obtain the two following interpretations: (d1) the individual  $i$  under consideration believes that the majority of agents on the market, taken one by one, believe that shares are under-valued; (d2) the individual  $i$  under consideration believes that the majority of agents on the market, taken one by one, believe that " the market believes that shares are under-valued ". In the definition (d1) the proposition  $P$  is central; in the definition (d2) it is the proposition  $CGP$  that is central.

A priori, both of these definitions (d1) and (d2) are equally interesting, in that both of them illustrate a cognitive approach that seeks to apprehend

the group as an entity, by attributing a belief to it. We believe that it is precisely through the intermediary of this cognitive capacity, which enables individuals to attribute beliefs to the group as such, that the group actually acquires an effective existence: through the collective beliefs to which it gives rise it demonstrates its ability, as a group, to shape individual behavior and consequently asserts itself as an independent force that must be taken into account. However, we must stress that these two definitions are not equivalent. In the case of (d1), the group belief is simply the belief of the majority of individuals, as estimated by the individual  $i$ . When individual beliefs are so disparate that there is no obvious, unquestionable majority belief<sup>1</sup>, then group belief in the (d1) sense becomes extremely uncertain in the eyes of the very individual trying to calculate it. This individual is then perfectly conscious of the fact that another individual may very well differ in his calculation. In other words, we are still dealing with a group belief, but one that is strongly dependent on the individual evaluating it. This is not necessarily a problem, but it can be. In certain circumstances, individuals may wish to find an opinion that can transcend this subjective indetermination and appear to everyone (or at least to the majority) as the group belief. We are no longer necessarily seeking the belief of the group but a belief that every individual (or a majority of them) is prepared to accept as being specific to the group. This is the concept defined by (d2). In the case of a financial market, both approaches are possible. One can seek to discover what the agents think about a certain security and one can also try to find out what opinion predominates as the characterization of the market per se. Intuitively, we feel that the two definitions do not necessarily lead to the same belief.

In the first section of this chapter, we shall show that group belief as defined by (d2) is often used in structures of interaction of the "pure coordination game" type. To do so, we shall draw on the important work of Judith Mehta, Chris Starmer and Robert Sugden. We shall show that definition (d2) corresponds to what they call "Schelling salience" in honour of the theoretician Thomas Schelling, who provided many reflections on salience in his book *The Strategy of Conflict* (1960). In the second section, we shall emphasize the fact that group beliefs in the (d2) sense of the term take various forms for one and the same proposition, depending on the contexts, whether these latter are social or historical. This can be explained by the fact that these contexts influence the way in which individuals perceive the identity of the group  $G$ . We shall use the term "situated rationality" to denote the specific type of cognitive rationality used by the agents to "calculate" the group belief in the (d2) sense. Lastly, the third and final section will highlight the fact that group belief in the (d2) sense is radically different from group belief in the (d1) sense. In this context we shall explore the autonomy of group belief.

---

<sup>1</sup> When the majority belief is, on the contrary, very clear-cut, we call it a "stereotype". In the case of stereotypes, group belief in the sense of (d1) and in the sense of (d2) are identical. We will come back to this point later.

This characteristic is essential. It signifies that group belief in the (d2) sense is not made up of an aggregate of individual beliefs. It directly grasps the collective identity of the group  $G$ . In this last section we shall focus more specifically on financial markets.

## 12.2 Pure coordination games and Schelling saliences

Let us consider a game with two players, denoted (1) and (2). Player (1) chooses his strategy in the set  $\{s_{11}, \dots, s_{1n}\}$  with  $n \geq 2$ . Player (2) chooses his strategy in the set  $\{s_{21}, \dots, s_{2n}\}$ . Let us assume that the strategies chosen are  $s_{1g}$  and  $s_{2h}$ . If  $g = h$ , each player receives a utility of 1; if  $g \neq h$ , both players receive a utility of 0. There are therefore  $n$  strict Nash equilibria. The players are indifferent as to the choice of equilibrium. Such a game is called a "pure coordination game". In addition, we shall consider situations in which the players are drawn at random from within a pre-defined group  $G$ . Thus, player (1) does not know the identity of the player with whom he will be playing. He only knows that this player is drawn at random from the group  $G$ . When we analyze such a game from the point of view of standard rationality, we find that the probability that two players simultaneously choose the "same" strategy  $s_{1k}$  and  $s_{2k}$  is equal to  $\frac{1}{n}$ , as all the strategies are perfectly indistinguishable from each other. However, when the game is played with real players, we observe that they coordinate much more efficiently than  $1/n$ . How does this come about? It occurs because the players use a specific rationality, neglected by standard theory, based on the very wording of the strategies and on the pre-definition of the group  $G$ . Expressed in our terms, this rationality is oriented towards the determination of the "group  $G$  belief". In practical terms, the player who is considering what his partner - drawn at random from the group  $G$  - will play, asks himself what the opinion of group  $G$  is and plays in consequence of the answer. In other words, the players focus directly on the identity of the group  $G$  and, curiously, the group beliefs that they calculate are relatively convergent. How do they do it? To understand this phenomenon, we are lucky to be able to draw on the work of Judith Mehta, Chris Starmer and Robert Sugden (1994).

These authors considered the specific pure coordination game that consists in choosing a natural number. To improve their ability to interpret the results, Mehta et al. started by selecting a first group, denoted  $P$ , the members of which were simply asked to choose a natural number greater than or equal to 1, without any context of coordination. By doing this, the authors obtained information about the "primary beliefs" of the test population. A second group, denoted  $C$ , was then selected to play the coordination game using the rules specified above. The results are given in table 1. For each group, we indicate (1) the four most frequently-given replies; (2)  $r$ , the total number of different replies given; (3)  $c$ , a global index of coordination with a

value of between 0 and 1, equal to the probability that two individuals drawn at random from within the group have given the same reply.

Group P ( $n = 88$ )		Group C ( $n = 90$ )	
Replies	Proportion	Replies	Proportion
7	11.4	1	40.0
2	10.2	7	14.4
10	5.7	10	13.3
1	4.5	2	11.1
$r = 28$	$c = 0.052$	$r = 17$	$c = 0.206$

Table 1 (Mehta, Starmer and Sugden, 1994: table on page 667).

In the control group  $P$  of 88 individuals, there were 28 different replies. The numbers chosen the most often were 7 (11.4%), then 2 (10.2%), 10 (5.7%) and 1 (4.5%). When we examine the behavior of group C, we can see that the coordination is very efficient, in accordance with the theories of Schelling. This is true whatever criterion we use: the number of different replies drops to 17, the coefficient of coordination reaches 0.206 and the number 1 obtains 40% of the opinions of the group. The three authors consider a priori three possible explanations for this astonishing capacity for coordination of the players. Firstly, they introduce the concept of "primary salience": according to this first hypothesis, which they qualify as nonrational, each agent "gives any response that happens to come to mind at the time" (page 660). In other words, in the list of labels proposed, the individual chooses the one that, in his opinion, conforms the most to the question asked: what we have called his "primary belief". Thus, in the case of the game consisting in the choice of a strictly positive natural number, the player's favorite number is an example of a primary salience. If the two players have shared past experiences and the same cultural background, the choice of primary salience can lead to successful coordination and, consequently, explain the results obtained. Secondly, Mehta et al. introduce the concept of "secondary salience": one player hypothesizes that the other player will choose his primary salience and, consequently, he chooses what he believes to be the most likely primary salience of this second player. It is this choice that is called "secondary salience". If all the individuals choose their secondary salience, then the coordination can succeed, on the condition that they share the same beliefs about the opinions of the group. Furthermore, in such a situation, "we should expect the ranking of choices in terms of frequency to be similar to the ranking of the corresponding labels in terms of primary salience" (page 661). Lastly, the authors introduce a third concept, which they call "Schelling salience" because for them it represents a formalization of the ideas previously advanced by this theoretician. Schelling's central idea was that in order to coordinate, the players try to find a choice or principle such that, from the point of view

of the group, it gives a unique reply and results in successful coordination: " A rule of selection (and by extension, the label or strategy that it identifies) is salient to the extent that it suggests itself or seems obvious or natural to people *who are looking for ways of solving coordination problems* " (p. 661). It is this rule that we designate by the term " Schelling salience " .

Clearly, " secondary salience " corresponds to what we have called the (d1) definition of group belief and " Schelling salience " to what we have called the (d2) sense of group belief. In Schelling salience, an individual  $i$  seeks to determine a proposition  $Q$  such that in his opinion, the majority of members of the group believe that " the belief of the group  $G$  is  $Q$  ". By definition,  $CGQ$  is a salience for the individual  $i$  because this proposition appears to him to be the majority choice. It imposes itself as a focal point. The experiment carried out by Mehta, Starmer and Sugden shows that individuals are rarely mistaken and are capable of finding the proposition  $Q$  that is likely to be chosen by a large proportion of the group.

For these authors, the choice of the number 1 is an example of Schelling salience. They observe that the choice by group  $C$  of the number 1 is the result of a very specific and enigmatic cognitive process, in that it ignores the " personal " preferences of the players for certain numbers, which would lead to the choice of the numbers 7 and 2, and instead concentrates on direct determination of the reply that can obtain the unanimity of the group when each member analyzes the problem from the same angle. This is clearly apparent in the fact that " 1 ", the final choice, is only ranked in fourth place in the primary choices of the control group  $P$ . It is not chosen by group  $C$  because it is the favorite number of the players. Their reasoning here is quite different. If the individuals select the rule " choose the first number ", it is because of the following characteristic: when this rule is followed by all the players, it enables them unambiguously to designate a unique reply and results in successful coordination. This is precisely the point that Schelling had brought to light. On this subject, he wrote of a " focal principle ", in other words a principle that, when used by everyone, enables a unique strategy to be determined. This is the case for the principle " choose the first number " but not for the principle " choose a number you like ". As group  $C$  is in a coordinative situation, the members of the group reason neither on the basis of their primary beliefs nor on the basis of what they believe the primary beliefs of the others to be, which would have led to the choice of the number 7. Placing themselves on a more general level of abstraction, they set out to determine a principle capable of bringing out, in everyone's opinion, a unique equilibrium. Cognitive activity is focused on the group as a separate entity. Its aim is to produce a common reference point on a non-cooperative basis.

Here we find a first example of group belief as defined by (d2). Remember that, by definition,  $Q$  is a group belief in the (d2) sense for an individual  $i$  if he thinks that it is a group belief for a majority of the members of the group. Such is the very nature of the cognitive activity that leads certain individuals

to choose the number 1: the players in group  $C$  choose " 1 " because they see, in this reply, the choice capable of being chosen by the others when they all consider the problem from the same angle. The cognitive activity that is mobilized is fully focused on the group per se, and not on the individual preferences of the players. In this last hypothesis, we would obtain a group belief as defined by (d1) - resulting in the number 7 being chosen - if all the players were well informed about the personal opinions of the group members as revealed by the control group  $P$ . In this example, therefore, we can see that the two definitions of group belief do not lead to the same result. The strength of the (d2) definition lies in the fact that it totally disregards the variability in individuals' intrinsic preferences in order to define a belief that belongs to the group as a group. This is a great advantage because in many situations, the group belief in the (d1) sense is very uncertain, because of this variability in individual tastes, and therefore inoperable. When the individual  $i$  seeks to define the shared belief of the others, a large number of plausible replies may cross his mind. With the (d2) definition, this fact has no importance because, by definition, everyone is trying to determine which reply is capable of being a belief in the opinion of the majority of the others.

However, it should be noted that when a reply stands out clearly as being the majority choice, the (d1) definition of collective belief does in fact enable successful coordination to take place. In this case, we say that we are dealing with a " stereotype ". Stereotypic preference is, however, also a group belief in the (d2) sense of the term, so that this particular case does not detract from the general nature of the hypothesis that the definition (d2) should be used to consider Schelling saliences. In the experiments carried out by Mehta, Starmer and Sugden, this situation is encountered in the pure coordination game consisting in the choice of a boy's name. " John " is the name chosen by the most people in both group  $P$  and group  $C$ . This is because " John " is the stereotype of a boy's name.

### 12.3 Situated rationality and the role of contexts

In his work, Schelling attaches great importance to the role played by contexts in the finding of focal principles. We cannot follow this line of reflection very far using the previous example of the choice of a whole number, insofar as this is a game of a logical type and the specific identity of the group  $G$  therefore only plays a secondary role, if any. The following example, which we owe to David Kreps (1990, p. 120), allows us to go further by demonstrating that the equilibrium chosen is heavily dependent on the manner in which the players analyze the identity of the game participants. The group belief changes with variations in the definition of the group  $G$ .

Kreps explored the coordination game <sup>2</sup> consisting in the sharing-out of the 10 letters A, B, C, D, H, L, M, N, P and S into two subsets that must overlap as little as possible, given that the first team, denoted (1), must necessarily choose the letter B and the other team, team (2), must choose the letter S. Among the 256 different partitions of the remaining letters, representing all the possible equilibria of the game, the focal point equilibrium, according to Kreps, when no specific information is given about the groups of players <sup>3</sup>, is that which gives team (1) the first five letters, i.e. A, B, C, D and H and team (2) the last five letters, i.e. L, M, N, P and S. This is a further illustration of Schelling salience. However, Kreps added: " Note that the rule applied here is entirely dependent on the context ". To demonstrate this point, he considered the same game, but with team (1) composed of Harvard students and team (2) composed of Stanford students. Both teams were informed of this fact. 10 towns were proposed: Atlanta, Boston, Chicago, Dallas, Houston, Los Angeles, Miami, New York, Philadelphia and San Francisco. Team (1) had to choose Boston and team (2) had to choose San Francisco. From the point of view of fundamentalist rationality, the two game situations are strictly equivalent. Nevertheless, Kreps reported (p. 121) that in nearly 75% of situations the Harvard students chose Atlanta, Boston, Chicago, Miami, New York and Philadelphia while those from Stanford chose the remaining towns, namely Dallas, Houston, Los Angeles and San Francisco. Here, the focal point is the geographical division of the USA into two parts lying to the east and west of the Mississippi. This is different from the previous focal point.

Here we can see the full influence of context in the determination of group belief, which is closely dependent on the group under consideration, on what is known about it, and not only on the intrinsic content of the question itself. Thus, if this list of towns was given to non-American players, with knowledge of the Latin alphabet but no knowledge of the geography of the USA, they would return to the first solution, for they could not hypothesize that all the players know American geography. In these conditions, the taking into account of the first letter can emerge as the " focal principle ". More paradoxically, this can even be the case when the players are American, if they do not know that they are. In this case, each player cannot hypothesize that the geographical partition based on the Mississippi is a group belief. We can see that the manner in which the players conceive the " collective identity of the group " appears as an essential factor in the problem, determining the formation of group beliefs in the (d2) sense of the term. All the elements belonging

---

<sup>2</sup> The game actually proposed by Kreps is rather different and notably more complicated. Here I present a simplified version that leads to the same conclusions but avoids an overly long presentation.

<sup>3</sup> In fact, in most situations, everyone knows or assumes a certain number of common qualities, such as speaking the same language: - the language in which the experiment is conducted.



to the common past of the group are used, whether they are historical precedents or cultural values. The example considered by Kreps demonstrates the effect of a cultural context, but the same result could be obtained with a historical " precedent " .

Financial markets provide us with a good example of the role played by historical precedents in the determination of social beliefs. It should be noted that here we are leaving the domain of pure coordination games in the strict sense of the term. To be more precise, we shall examine the work of Shiller (1991), devoted to the 19 October 1987, the day on which the New York stock market suffered its biggest ever recorded fall, a staggering 508 point drop in the Dow Jones, representing a fall of 22.6%. How can we explain a fall of this magnitude? The analysts all agree that it cannot be explained in terms of any fundamental information. We must therefore seek the answer elsewhere: within the inter-subjective and self-referential dynamics that are such a central feature of stock markets. Shiller had the idea of sending questionnaires to individual and institutional investors to find out what their motives were. The results he obtained highlight the role played by the great crash of 1929 in these events, serving as a model of reference for investors in their interpretation of and adaptation to the events taking place. Shiller noted that the crash of 1929 was very present in the minds of investors at the time the crash of October 1987 was triggered. To the question " Do you remember having thought or talked about the events of 1929 during the few days before 19 October 1987? ", 35% of individual investors and 53% of institutional investors replied " Yes ". For Shiller, the crash of 1929 imposed itself in everyone's mind as the relevant salience, in other words as the model enabling them to understand how a stock market crisis evolves. On Wednesday 14, Thursday 15 and Friday 16 October, in the week preceding the crash, the stock market had already undergone three considerable falls. So, during the weekend and Monday morning, investors were worried. The sharp fall of 200 points that occurred on Monday 19 October when the markets opened plunged the operators into a state of perplexity, confronted with these events of such an unusual nature. How would the market and the other operators react? In such circumstances, what can one expect of the market? Investors interpreted the events of 1987 in the light of those of 1929. Of course, the comparison brought little reassurance. It provoked strongly pessimistic predictions and gave powerful impetus to the climate of panic that ruled the stock market during the 19 and 20 October 1987. For Shiller, we cannot understand the over-reaction of the market without integrating into our analysis the role played by the salience " crash of 1929 " as the prototype stock market crisis. It is only by using this model that we can explain the excessive character of the falls and selling. This analysis is a powerful illustration of the role played by historical precedents in the determination of the collective beliefs of the market.

## 12.4 The autonomy of group beliefs

This analysis of the historical and cultural contexts in the production of group beliefs reveals a strange disconnection between the latter and individual beliefs. Individuals appear to be powerless, because the legitimate interpretations that determine the coordinative equilibrium are imposed on them regardless of their own individual opinions. The origin of these collective beliefs lies in the multiple, shared, historical and cultural points of reference that define the identity of the group. The past brings us customs, stories and legitimacies that severely restrict the freedom of individuals, whatever their own opinions may be, in their capacity to propose legitimate collective representations. Thus, economic agents suffer the imposition of equilibria that they would not necessarily have wished for, as demonstrated by the stock market crisis of 1987.

This autonomy of collective beliefs is forcefully revealed by the fact that situations can exist where, simultaneously, all individuals believe the proposition  $P$  and all individuals believe that the group believes the proposition  $Q$ , which is different from  $P$ , and yet neither of these beliefs is erroneous. How can such a paradoxical situation exist? Because the two beliefs answer different questions.  $P$  represents the primary beliefs of the group, i.e. what the members really think of the situation, whereas  $Q$  is what they think the group thinks in the sense of (d2). If we take the pure coordination game consisting in the choice of a whole number, it may be that each individual considers "7" to be the right number but also considers that the opinion of the group favors "1". The two beliefs are correct. If we question the individuals about their beliefs, they will reply "7". If we get them to play a coordination game, they will reply "1". As these situations are not founded on any errors, they can persist without the need being felt for any change in beliefs on any level. In other words, this means that we can have  $C_iP$  for all the individuals  $i$  in the group and at the same time  $C_iCGQ$  for the same individuals - a situation that we have referred to previously as the "Reagan effect" (Orléan, 1999, pp. 79-81) - without any corrective force appearing to close the gap between personal and group beliefs. It must be noted that it is quite a different matter when we consider group beliefs in the (d1) sense of the term. In this case, collective belief has no autonomy, insofar as the gap between individual and collective beliefs cannot exist, unless some of the beliefs are erroneous. The definition (d2) again proves itself to be the richer and more innovative conception of collective belief. The property of autonomy that it characterizes leads us to modify profoundly the way in which we understand economic interactions. It brings to light a new type of reasoning, at odds with the classical individualist model that treats collective representation as the "sum" of individual opinions. Consequently, two levels and two ways of reasoning coexist, and the articulation between them needs to be analyzed.

The analysis of coordination games enables us to understand why this is so. We have seen that a careful distinction must be made between what an individual really thinks and what he effectively chooses. This originates in the very nature of the interaction under consideration, which rewards, not those who are "right" and who answer the question put to them "correctly" - if indeed we can give sense to this concept - but those who best succeed in predicting the movements in majority opinion. Applying this crucial distinction to financial markets may thus prevent the overhasty judgments of irrationality of which financial investors are often the target, for example when a discrepancy can be observed between the current price and what economists consider to be the fundamental evaluation. Let us take the example of a currency, already under-valued and yet which is the object of a large movement of selling on the foreign exchange market, leading to an even greater under-valuation. Foreign exchange brokers are then accused of being irrational, in the sense that they are making a poor estimation of the fundamental value of the currency in question. This hypothesis does not hold up. It is not even necessary. Foreign exchange brokers, like every body else, may know perfectly well that the currency is under-valued and yet continue to sell it. What counts for them when they operate on the market is not their opinion of the true value of the currency, insofar as they can estimate it, but how they believe the market is going to behave. Brokers make profits on a market by correctly predicting the evolutions in group opinion. This is the rule of the game. They are not asked to be right in their estimation of the fundamental value of a currency. From this point of view, the following comments made by a broker during the sharp fall in the euro in September reveal quite clearly the dichotomy between personal valuation on a fundamental basis and investment choices. This individual is firmly convinced that the euro is under-valued but, he explains, he is nevertheless obliged to sell to avoid losing money: "As a broker, however much I believe in a rise in the euro, I'm powerless when I see all around me that the other operators on the exchange market are selling euros. For the same reason, even if I judge that the euro deserves to be worth more against the dollar, I still hesitate about buying the European currency. If I'm the only buyer up against fifty brokers that are selling, I'm sure to get my fingers burnt... I don't necessarily follow my own personal convictions, but rather what I believe will be the overall movement of the market, which always comes out on top. The broker's work is try to estimate as precisely as possible the mood of the exchange market"<sup>4</sup>.

Despite his personal conviction that the currency is under-valued, this broker stakes his money on a further fall and this is perfectly rational behavior: if he had bought euros, he would have lost money!

One way to consider this situation consists in following the interpretation suggested by the broker being interviewed. He contrasts two valuations: the

---

<sup>4</sup> *Libération*, 8 September 2000, p. 24.

fundamentalist assessment and the belief of the market in the (d1) sense of the term, i.e. the belief of the greatest number of brokers. In this context, the individual giving the interview justifies his follow-my-leader attitude by the fact that there are a great many investors selling - more precisely " fifty brokers that are selling " - who determine the belief of the market. According to this analysis, these " fifty brokers " sell because they believe the euro is over-valued. They are therefore laboring under a misconception, if we consider the fundamental beliefs that have led them to sell. Faced with this *fait accompli*, our broker has no choice. He can only go along with the inappropriate majority opinion. If we accept this interpretation, we do not observe what we have called the " autonomy of collective beliefs ", in other words a situation in which, for all the agents, a discrepancy can be observed between their personal opinions and their evaluation of the group belief. In fact, according to the interpretation offered by our broker, for the " fifty brokers ", personal belief and group belief converge perfectly in predicting a future fall in the euro. Only the broker interviewed remarks a difference between his fundamentalist valuation and the belief of the market. This absence of autonomy is not surprising. It is a consequence of the fact that we have been considering the broker's interpretation and that this interpretation is based on a (d1) definition of the belief of the market.

This interpretation is not necessarily false. There may in fact exist, in certain specific economic circumstances, naive, ill-informed or irrational investors on the market. This is a matter of fact. If this is the case, the negative bubble affecting the euro can easily be explained by the fact that a great number of ignorant investors are present. However, this approach leaves a central point in the dark: why are the fifty brokers so mistaken? What mechanism can explain that such an error can spread through the market? It is therefore interesting to explore an alternative analysis, abandoning this doubtful asymmetry between one perfectly rational broker and a market composed of dull-witted operators. According to this new interpretation, the fifty other agents are acting in exactly the same way as our broker: like him, they are behaving in a self-referential way, based on their own belief concerning the market. However, in accordance with the previous analysis, the group belief that must be considered comes within the (d2) definition of the term and not the (d1) definition: " everyone believes that the market believes in a fall in the euro ". From this point of view, everyone is equally rational, acting out of the same belief concerning the behavior of the others. There are not fifty brokers hellbent on selling, but fifty brokers who, after reflecting on what the others - including the trader interviewed by *Libération* - are going to do, predict that they will sell. If they were interviewed, they would also explain that it is no good going against the mood of such a blindly determined market. And they would be right. The real belief here is not about the value of the euro, but about the fact that " everyone believes in the downward character of the market " .

Here we again find our situation of disconnection between personal beliefs, all convinced that the euro is under-valued, and the group belief in the (d2) sense, according to which the market predicts a fall. We have  $C_iP$  for all the individuals  $i$  in the group, where  $P$  is the proposition "the euro is under-valued" and simultaneously  $C_iCGQ$  for the same individuals, where  $Q$  is the proposition "the euro is over-valued". If everyone believes that "everyone believes in a fall" then everyone will sell and the market will indeed fall, thus validating ex post facto the initial belief. We thus observe the phenomenon of self-fulfilling prophecy. In such a situation, a bubble emerges without any need to assume the presence of irrational agents. Each individual is perfectly rational, both in his personal valuations and in his assessment of the market. It is not necessary to assume erroneous valuations. All that is needed is for all the agents to make their choice on the basis of a certain model of the market, considered to express a separate logic. Investors who have the impression that they are only reacting to this market model thus find themselves absolutely justified in their vision of the autonomy of the market, because the euro continues to fall, despite their generally-held belief that it is under-valued. They find this autonomy all the more undeniable since the evolution observed has no coherent explanation in fundamentalist analysis. So, far from impelling the group belief to be adapted to private opinions, this situation further strengthens the legitimacy of the group belief, which imposes itself as the only plausible explanation. The experience of the market validates the hypothesis of the autonomy of collective valuation<sup>5</sup>. Beliefs are confirmed on all levels: the fundamental valuation of the euro is indeed under-valued; the market does indeed believe that it will fall; the market does indeed behave in an autonomous manner, i.e. disconnected from fundamentalist valuations.

## 12.5 Conclusion

In the context of our definition (d1), analyzing a collective belief or "group belief" means analyzing the personal beliefs of the individuals making up the group. We remain within the methodological framework of strict individualism. A collective belief is no more than the aggregate of individual beliefs. Things are quite different when we use our definition (d2), for in this case it is the group as such and the character of its identity that become essential. There follows a possible and enigmatic disconnection between individual and collective beliefs - what we have called the autonomy of group beliefs. It is

---

<sup>5</sup> This enigmatic situation, in which private information does not succeed in modifying the collective choice, does have equivalents in the theoretical literature. In "electronic mail game" type situations (Rubinstein, 1989), one can observe similar blocages, in the sense that the exchange of messages - however numerous - between two individuals does not succeed in generating the shared knowledge required for a certain action to be performed by the two players. Information cascades also have this characteristic.

important that cognitive economics does not limit itself to the analysis of individual beliefs but also explores collective representations and their autonomy. This necessity is all the more imperative since many phenomena of interaction and coordination appear to be founded on the concept of group belief in the (d2) sense of the term.

## References

1. Kreps D., "Corporate Culture and Economic Theory" in Alt James and Shepsle James (eds.), *Perspectives on Positive Political Economy*, Cambridge University Press, Cambridge, 1990, pp. 90-141.
2. Mehta J., Starmer C. and Sugden R., "The Nature of Salience: An Experimental Investigation of Pure Coordination Games", *American Economic Review*, vol. 84, n:2, June 1994, pp. 658-673.
3. Orléan A., "Le Pouvoir de la Finance", Odile Jacob, Paris, 1999.
4. Rubinstein A., "The Electronic Mail Game: Strategic Behavior Under 'Almost Common Knowledge'", *American Economic Review*, vol. 79, n:3, June 1989, pp. 385-391.
5. Schelling T., "The Strategy of Conflict", Oxford University Press, Oxford, 1977 (1960).
6. Shiller R., "Market Volatility", Massachusetts Institute of Technology, 1991.