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11 Reasoning together: From focusing to decentering

Fabrizio Butera and Céline Buchs

Introduction

Focusing is a pervasive phenomenon occurring in reasoning and decision making, which has been thoroughly described by Legrenzi, Girotto, and Johnson-Laird (1993). It consists in the fact that reasoners seem to restrict their thoughts to what is explicitly represented in their mental models. Legrenzi and his colleagues have demonstrated that this phenomenon is a very general one, and concerns such domains as deductive reasoning, decision making and counterfactual thinking. Focusing is believed to be an inevitable consequence of the use of models in reasoning and depends on the fact that individuals construct very few explicit models when reasoning, focus on these models, and ignore other alternatives. However, this effect can be inhibited. In the above cited article, Legrenzi et al. also propose, and demonstrate, that the effects of focusing can be reduced by any manipulation that leads individuals to flesh out alternative models.

In the present chapter, we make this idea more specific, and introduce the notion of decentering, a mechanism supposed to reduce the focusing effect, since it leads individuals to take into account alternative models and points of view. We show how decentering can be induced both by a manipulation of the representation of the task and by confronting individuals with a source of social influence. This latter phenomenon is important, because reasoning often takes place in situations in which reasoners encounter diverging models, alternative viewpoints, and conflicts with people with whom they are working.

Egocentrism, decentering, and related concepts

Decentering has been known for a long time in the psychological literature. In Piaget's early writings, and all through his career, egocentrism and decentering appear to be central mechanisms in the development of the intellect (cf. Inhelder & Piaget, 1958; Piaget, 1963). Egocentrism is a mechanism that resembles focusing: It consists in considering one's own judgement as the only possible one, overlooking alternative ones. For instance, a 5-year-old child considers that the left and right hands of the person standing in front of

him/her are those that directly correspond to his/her left and right hands. Decentring occurs in later stages of development, and relates to the ability to take different perspectives; i.e., the ability to understand, for instance, that a person who views a scene from a different point of view sees things differently. In this respect, decentring allows individuals to understand that their own point of view is not the only possible one, and to consider other alternatives. However, and critical for our contention, Piaget's decentring *occurs* with development. After a stage of its complete absence (up to 4–5 years old), there follows a stage in which children recognise that different points of views can exist, but they have no mastery over them. Development into a third and final stage (starting from 8 years old) allows children to co-ordinate different points of view, and to understand what others think.

Contrary to Piaget, there is an abundant evidence that egocentrism is still present in reasoning and judgement well after the age of 8, and that it is important to develop means of decentring to overcome the effects of focusing. This evidence is so abundant that Greenwald has described the self as the "totalitarian ego" (1980). Indeed, it appears that individuals encode events in memory only from their own point of view (Tulving, 1972); that they are convinced that they influenced events which are in fact aleatory (illusion of control, Langer, 1975); that they recall information confirming their expectations better than disconfirmatory information (Mischel, Ebbsen, & Zeiss, 1976); that they judge messages as more persuasive if the messages are in line with their opinions than if they oppose their opinions (Greenwald, 1969); that they judge other people on the basis of the first description (primacy effect, Luchins, 1958); and so on. This incomplete list shows that phenomena related to some kind of egocentrism still occur in adults, as – by the way – demonstrated by the focusing effects described by Legrenzi et al. (1993). Clearly, there is a need for decentring. In line with this idea, many authors have argued that it is possible to reduce people's egocentrism, with a significant benefit for problem solving, judgement, accuracy and reasoning. They all converge in recognising that *confirmation* with somebody else's position can lead to decentring and result in increased attention to alternatives.

Johnson and Johnson (1995), for instance, have shown the link between controversy and perspective taking (see also Tjosvold, 1998; Tjosvold, Johnson, & Fabrey, 1980), a form of decentring. Controversy is a discussion between two or more partners in which opposing opinions clash: it has been shown that controversy promotes perspective taking, the understanding of another's knowledge and reasoning (see also Kohlberg, 1969). Perspective taking, in turn, results in benefits for learning, interpersonal relations, as well as for cognitive and moral development (Johnson & Johnson, 1995). For instance, groups who received perspective-taking instructions produced significantly more creative solutions than groups who received egocentric instructions (Falk & Johnson, 1977). Moreover, perspective-taking instructions increased perceived co-operation, trust, attraction, satisfaction among group members, and effective communication. Perspective taking as a process

of information exchange has also been proved to stimulate individual change toward more accurate judgements (Johnson, 1977).

In a similar vein, Wicklund has described "multiple perspectives" as a tool for reducing self-serving biases, restrictive goal orientations, and for promoting the acquisition of new repertoires (Wicklund, 1999; Pantaleo & Wicklund, 2001). Multiple perspectives are a form of perception in which "people can recognise that an event can be viewed, defined and perceived in more than one manner, through several focal points" (Wicklund, 1999, p. 667).

Beyond the above conceptions, one theory is particularly relevant for our argument: the socio-cognitive perspective proposed by Doise and Mugny (1984). This perspective is relevant for two interrelated reasons. The first reason is that these authors demonstrated that confronting a child with a diverging point of view (a socio-cognitive conflict) can lead the child to abandon an egocentric mode of problem solving in such Piagetian tasks as conservation of length, conservation of liquids, spatial orientation. The change occurs prior to the Piagetian stage of "co-ordination", which is supposed to be necessary for its appearance. Thus, confrontation with a source of "influence" can lead to decentring. The second reason is that this research has shown that not every source of influence can induce decentring, and that the effects are found with an influence source of same status (in terms of competence) as the participants, or even of lower status. When children are confronted with a higher status source, no progress is observed, and they maintain their egocentric mode of problem solving. With a high-status source, the difference in power is overwhelming and threatens the children's competence. This leads to mere compliance without internalising the source's position, thereby maintaining the children's original point of view. With a low-status source, children are not threatened and can find a solution to the divergence between their position and the source's position. Hence, they decentre and create the basis for development (see also Butera & Mugny, 1995).

In the remainder of this chapter, we present a set of studies that illustrate how decentring can overcome focusing effects such as confirmation bias, and how decentring can be induced by confronting participants with a source of influence, provided that its status does not threaten their competence.

Confirmation bias and decentring

To study decentring as a result of social influence, we developed a line of research to investigate confirmation bias, a form of focusing effect (Butera, Legrenzi, & Mugny, 1993; see also Butera & Mugny, 2001). Indeed, research on hypothesis testing has shown a systematic tendency towards confirmation: Individuals who have to test their hypotheses tend to use procedures that support these hypotheses, even in tasks in which disconfirmation would be more diagnostic (e.g., Gorman & Gorman, 1984; Mynatt, Doherty, & Tweney, 1977; Wason, 1960; but cf. Klayman & Ha, 1987). What is interesting

for the purpose of this chapter is that several authors agree that confirmation as a "bias" is due to a lack of activation, analysis and articulation of alternative solutions to a problem (e.g., Johnson-Laird, 1983; Kruglanski & Maysless, 1988; McDonald, 1990). In fact, it has been noted that disconfirmation is possible when reasoners consider alternative solutions (Gorman & Carlson, 1989).

Our general claim is that hypothesis confirmation and disconfirmation are reasoning processes specific to particular social situations (Butera, Legrenzi, Mugny, & Pérez, 1991-1992). Indeed, hypothesis testing most often takes place during situations of social confrontation; i.e., in situations where one may be confronted with the alternative hypothesis proposed by someone else. In particular, social psychologists have shown that exposure to a majority's model or proposal induces conformity (Moscovici, 1980) and cognitive functioning of a convergent type, i.e. confined to the use of information at hand (Nemeth, 1986; Nemeth, Mosier, & Chiles, 1992). These results suggest that the majority's proposal induces individuals to take it into account in formulating their own hypothesis. Convergent thinking should then bias individuals to take into account only the elements and characteristics of this hypothesis. Thus, when individuals test a hypothesis, they should consider positive examples of the hypothesis under test. In short, individuals should be oriented toward the use of confirmation in social situations that inculcate an expectation of conformity to the majority.

Furthermore, research in social influence has shown that when a model is given by a minority source, individuals are not motivated to adopt it (Moscovici, 1980) because the source does not guarantee the validity of its proposal (Nemeth, 1986). Thus, when individuals must come to a reliable solution to a problem, they are unlikely to trust a minority source. Minorities accordingly induce divergent thinking, which is a form of decentering proposed by Nemeth (1986) to account for the cognitive processes of problem solving when faced with a minority source. Hence, "minorities stimulate a greater consideration of other alternatives" (p. 25). In fact, several studies have shown that individuals faced with a minority source do search for alternatives (e.g., De Dreu, De Vries, Gordijn, & Schuurman, 1999; Nemeth & Kwan, 1985). Moreover, a study by Huguet, Mugny, and Pérez (1991-1992) suggests that minority influence induces decentering; i.e., the possibility of taking into account several points of views when formulating a judgement. We propose that individuals confronted with a minority proposal should be less motivated to adopt it and more likely to choose or to formulate an alternative hypothesis. Hence, in the case of hypothesis testing, minority influence elicits mechanisms that question the limits of a hypothesis, and in turn the use of negative instances to test the hypothesis; i.e. instances that are not compatible with the hypothesis under test, with the aim of disconfirmation. In fact, the use of disconfirmation is linked to the ability to imagine an alternative hypothesis, since it is difficult for individuals to try to disconfirm the only available hypothesis.

Minority influence and decentering

In our experimental paradigm, the participants have to discover the rule underlying triads of numbers triad (e.g., 2-4-6; see Watson, 1960). They were asked to formulate a hypothesis and to propose a triad to test it. *Before* being allowed to answer, the participants were informed of the hypothesis and of the triad proposed to test it either by the majority (82 per cent) or a minority (12 per cent) of previous participants. In fact, we used the same hypothesis in both cases: "each new number is greater than the previous one". In other words, the participants experienced a social influence. In the first experiment (Legrenzi, Butera, Mugny, & Pérez, 1991), the triad proposed by the majority or minority source was either confirmatory (e.g., 8-10-12), or disconfirmatory (e.g., 12-10-8) with respect to the source's hypothesis. The results showed that more participants used the source's hypothesis in the majority condition, and that more participants formulated new hypotheses when the minority used a confirmatory strategy. Although the participants' main strategy in all conditions was confirmation, more participants used disconfirmation when this strategy was used in the initial triad proposed by the source, which corroborates the results of Gorman and Gorman (1984). More importantly, when the source used confirmation for testing the hypothesis, the participants' strategy depends on whether the source was the majority or the minority. When the majority used confirmation, the participants almost never used disconfirmation, whereas when the minority used confirmation, the participants used disconfirmation more often, and these participants proposed the highest rate of new hypotheses. In a second experiment (Butera, Legrenzi, Mugny, & Pérez, 1991-1992), also using a 2-4-6-like task, a minority source again induced participants to formulate new hypotheses and to use disconfirmation more often than a majority source.

A minority source evidently elicits decentering, and a majority source elicits focusing. We accordingly devised an experiment to test whether a majority source induces more conformity (imitation) and more confirmation because it produces focusing, and whether a minority source elicits alternative hypotheses and disconfirmation because it produces decentering (Butera, Mugny, Legrenzi & Pérez, 1996). We manipulated two variables. The first variable was the nature of the source, either a majority or a minority; and the second variable, which concerned the representation of the task, was whether the participants were told that the task allowed one single correct answer (the focusing condition) or several possible answers (the decentering condition).

The results showed, as in the previous experiments, that the nature of the source induced differential effects. The representation of the task induced differential effects too - it is the mediating variable accounting for the source's effects. Indeed, an interaction showed that the participants given the majority view tended to accept the source's hypothesis and to use confirmation more when the task was represented as having a single solution than when it was represented as having several solutions. Moreover, the participants

given a minority view tended to consider alternative hypotheses (different from those of the source) and to use disconfirmation more when the task was represented as having several solutions than when it was represented as having a single solution. In sum, a majority source may threaten individuals, since an apparent unity of opinion calls for conformity and for confirmation as a sort of self-protection: Confirmation asserts self-competence. Conversely, a minority source does not threaten individuals or their competence, and it allows decentring and disconfirmation.

Competence threat and focusing

We have argued that the differential effect of majority and minority sources results from different levels of threat to the individual's competence. However, in the previous experiments, the status of the source was not directly related to the competence of the source (though Nemeth, 1986, has noted that people generally assume that a majority is correct and a minority is incorrect). The following experiment (Butera, Mugny, & Tomei, 2000, study 1) had two aims. On the one hand, it aimed to show that the influence effects discussed above are found when the competence of the source is directly manipulated. The participants in this experiment – whose procedure is identical to the previous ones – were accordingly presented with information from either an expert or a novice, which thereby explicitly referred to their level of competence. On the other hand, the experiment aimed to show both that a low status source has a decentring effect and that a high status source has a focusing effect. Hence, the experiment introduced a control condition in which there was no source of influence. We predicted that the novice source should induce more disconfirmatory testing than the control, and that the expert should induce more confirmatory testing than the control. But these effects were expected only when the participants judged under uncertainty, because certainly should reduce the participants' dependence upon the source. We manipulated certainty by leading the participants to think that responses to the task were highly predictable, i.e., almost certainly, or highly unpredictable, i.e., most uncertain.

There was a significant interaction between the two variables corroborating our hypotheses. Under certainty, the status of the source had no impact, and neither the low-status nor the high-status source yielded results that differed reliably from those in the control condition. Under uncertainty, the two expected differences appeared: The low-status source induced more disconfirmation than the control condition, whereas the high-status source induced less. This experiment not only shows the beneficial effect of a low-status source when the competence of the source is directly asserted, but it also shows that the high-status source can enhance the focusing effect. Indeed, this condition produced significantly more confirmation of hypotheses than the control condition. This result suggests that the focusing effect is linked to a threat to participants' competence. In threatening situations, such

as a conflict with a high-status source that undermines individuals' competence, they can be motivated to stick to the few models that they have constructed. This phenomenon could occur for two compatible reasons: on the one hand, threatened individuals have fewer cognitive resources to allocate to the task because their attention is concentrated on the conflict (see also Wicklund, 1999); on the other, individuals who focus on their own models and ignore alternatives are likely to think that they are right and to have an enhanced perception of their own competence.

Reducing the high-status source focusing effects

So far, we have shown that low-status sources can induce decentring and so reduce confirmation bias, whereas high-status sources induce focusing and enhance the use of confirmation. The following experiment (Butera, Gardair, Maggi, & Mugny, 1998, study 3) aimed to test the hypothesis that if decentring can be induced through the nature of the task, it should reduce the focusing effect (the high rate of confirmation) of a high-status source. We therefore predicted that inducing decentring should allow a high-status source to lead to an increased use of disconfirmation in comparison with a condition where decentring was not induced. It was also hypothesised that the induction of decentring should not have any effect on the influence of a low-status source, because this source induces decentring in itself. The experimental design thus involved the status of the source (high versus low) and the decentring procedure (present versus absent). The dependent variable was, as in the previous experiments, the confirmatory versus disconfirmatory strategy used in hypothesis testing.

The experiment manipulated decentring in the following way. Half of the participants in the decentring conditions looked into a black box through a hole and saw a square. The other half of the participants looked through another hole and saw a triangle. The participants then had to exchange information about what they saw and to guess what was in the box. In fact no one succeeded, and most of the participants just reported what they had seen. Finally, the experimenter opened the box to reveal a pyramid. This outcome was used to explain the importance of taking into account other individuals' information, even if it seems incompatible. In sum, the decentring manipulation allowed the experimenter to enhance the idea that perspective taking is valuable, even when the other's position seems wrong. Half of the participants received the decentring instructions, and half of the participants were in a control condition that did not receive the decentring instructions.

As we predicted, when the source was of low status the decentring procedure produced the same disconfirmation rate as in the control condition. But with a high-status source decentring led to more disconfirmation than in the control condition. Moreover, in the decentring conditions high- and low-status sources induced the same amount of disconfirmation. In sum, this study reveals two important mechanisms. First, even if high-status sources

induce a focusing effect (as shown in the previous study), the effect is not inevitable and decentring can compensate for this focusing. Second, a low-status source induces decentring by itself because no differences in disconfirmation rate appeared when decentring was induced independently.

Generality

Decentring appears to be a robust phenomenon. However, its generality can be challenged on two counts. First, are its effects dependent on context? Indeed, they could depend on the specific experimental paradigm in our experiments. The studies do use roughly the same methodology. Yet decentring is *not* specific to the methodology. The evidence comes from an experiment in which, unlike the previous studies, the participants interacted with the influence source. Instead of reading the information from the source about a single hypothesis and test, the participants were confronted with the source throughout the experiment, which used several tests and hypotheses. Nevertheless, the experiment replicated the decentring effect induced by a low-status source (Butera, Caverni, & Rossi, 1999, study 1). The second question that can be asked is whether these effects depend on the specific 2-4-6 hypothesis testing task used in our experiments. But again we know that the answer is negative. The evidence comes from an experiment on decision making that examined moderating factors of the pseudodiagnosticity bias, which is also a focusing effect (Maggi, Butera, Legrenzi, & Mugny, 1998; Maggi, Legrenzi, Mugny, & Butera, 2001). This experiment showed that when the source of influence is of a low status, pseudodiagnosticity is at its lowest. Hence, the decentring effect induced by a low-status source seems to be a general effect. It appears with different methodologies and it compensates for different focusing phenomena, including confirmation bias and pseudodiagnosticity.

Conclusions

In this chapter we presented an account of social factors that intervene in reasoning. More specifically, we presented a line of research that shows the influence of information from a social source on inductive reasoning. We argued that if confirmation bias is a case of focusing in human reasoning, then decentring should be an effective tool to reduce this effect because decentring consists in taking into account models and views other than one's own. However, our studies showed that not every source of influence can induce decentring and thereby reduce the confirmation bias. The effect seems to occur only with low-status sources, whether they are a minority and/or low competence. Conversely, the studies showed that a high-status source maintains or even enhances focusing. Our interpretation of this phenomenon is that a conflict with a high-status source implies a threat to the individual's competence: If the competent person is right, then the

individual is wrong and therefore incompetent. This threat, in turn, is likely to orient the individual's reasoning towards a strategy of self-protection. Focusing is such a strategy because an exclusive consideration of your own point of view, coupled with a strategy of confirmation, helps you to maintain confidence in your own competence. This account could explain why confirmation is such a frequent strategy, since reasoning is generally at work in settings in which competence is highly relevant and might be threatened by others. These settings include experiments in a psychological laboratory, and even the work of a scientific research team. The bias is not intrinsic to the confirmatory behaviour, but arises from the constraints imposed by the environment (see Butera, Legrenzi, & Oswald, 1997a, 1997b). A low-status source is less threatening and leads to decentring, which has a strong defocusing effect. Contrary to the view that egocentrism is no longer a problem after childhood, the pervasiveness of focusing effects shows that decentring is needed even in adults. This chapter has shown how information from a non-threatening social source can fulfil this role. It leads to reasoning strategies that take into account other alternatives.

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