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How to cite

QUIAMZADE, Alain, MUGNY, Gabriel. Social Influence Dynamics in Aptitude Tasks. In: Social Psychology of Education, 2001, vol. 4, n° 3/4, p. 311–334. doi: 10.1023/A:1011388821962

This publication URL: https://archive-ouverte.unige.ch/unige:115778
Publication DOI: 10.1023/A:1011388821962

Social Psychology of Education **4:** 311–334, 2001.

Social influence dynamics in aptitude tasks

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Abstract. Learning and, more generally, the development of cognitive processes in children has been thought to depend on the nature of the conflict induced by confrontation with others (i.e., socio-cognitive conflict). The aim of this article is to extend this notion to social-influence situations involving adolescents and young adults through the presentation of a model that explains social influence in aptitude tasks. This model takes into account the differences or similarities of the competencies of the source and target. It conceptualizes the social versus epistemic regulations of conflict in terms of an identity threat that can be induced by social comparison. To illustrate parts of the model, several experiments are briefly summarized. One demonstrates the conflict regulation dynamics involved in the similarities or differences of the sources' and targets' competencies, while the others show how social-influence dynamics are modified by the presence or absence of a threat to self-competence.

1. Introduction

A basic notion in social psychology is that all forms of knowledge and cognitive capacities are grounded in social contexts (cf. Levine, Resnick, & Higgins, 1993). One may at a very general level assert a 'postulate of the social' in the cognitive development of children. This postulate is more relevant in domains where knowledge is learned or liable to change and where cognitive capacities are acquired. More specifically, it is the case in the social influence tradition and in developmental social psychology. Earlier writers such as Baldwin (1913), Mead (1934), Vygotsky (1962), and Piaget (1965), working in quite different fields, nonetheless agreed on the relevance of social aspects in development. Currently, it is assumed within developmental social psychology that knowledge and its construction are marked by prior knowledge, social representation of the task, and interactions between individuals (Doise & Mugny, 1984). The main propositions of this developmental social conceptualisation can be summarised (cf. Doise, Mugny, & Pérez, 1998) in terms of two basic principles, those of social regulation and conflict. During development, specific competencies allow children to participate in social interactions which permit them to acquire new and more elaborated competencies. Equipped with new competencies, children can participate with others in social interactions of a higher order (cf. Doise & Palmonari, 1984). Cognitive coordin-

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ations are constructed through these social interactions and are internalized. This kind of social interaction regulates progress because it favours the integration of cognitive centrations into a new, higher level cognitive organization. Once this new organization is established, children can use and practice this new cognitive ability on their own (Perret-Clermont, 1980). This means that once cognitive capacities are integrated, they are no longer just forms of 'interacting knowledge,' but individual ones. Children have appropriated the competencies to themselves, although this appropriation results from prior social regulations.

Social interaction is the source of cognitive advancement because of the socio-cognitive conflict that is generated by the confrontation of different individual centrations. The social constructivism thus generated is not necessarily based on the imitation of more advanced individuals or the social learning of correct centrations displayed by competent others. Indeed, social constructivism is also possible in confrontations with others functioning at a lower level (Mugny, Lévy, & Doise, 1978) or in peer confrontations, even if the alternative centrations leads to an incorrect representation of the situation.

The only requirement for such constructivism is the opposition of centrations and the conflict it generates. In sum, the appropriation and integration of cognitive tools is regulated by social interaction, thanks to the presence of a conflict, the resolution of which occurs through cognitive elaboration of the task and the centrations of others.

1.1. CONFLICT ELABORATION THEORY AND APTITUDE TASKS

The social-influence tradition has essentially focused upon who influences rather than on the kind of functioning that is influenced. It was initially proposed that to have an influence a source is needed to have sufficient psychological resources (Hovland, Janis, & Kelley, 1953; French & Raven, 1959), and, depending on the nature of these resources, different pressures were exerted (Deutsch & Gerard, 1955). Thus, a majority, high status, or high credibility source should have more influence. Somewhat later, researchers also became interested in sources without any power such as minorities and low status or low credibility sources. Thus, social psychologists have, for example, explored majority and minority influence (cf. De Vries, De Dreu, Gordijn, & Schuurman, 1996) with respect to such basic functions as inhibition (Nemeth, Mosier, & Chiles, 1992), visual perception (Nemeth & Wachtler, 1983), nonambiguous perceptual judgements (Asch, 1956; Moscovici, Lage, & Naffrechoux, 1969), higher cognitive reasoning (Legrenzi, Butera, Mugny, & Pérez, 1991), and attitudes towards such issues as homosexuality (Clark & Maass, 1990) and abortion (Pérez & Mugny, 1987). Generally, it was assumed that, depending on the nature of the source, influence processes were the same whatever was the task. In other words, even if social psychologists have implicitly accepted that all cognitive capacities or forms of knowledge can change in response to majority and minority influence processes, no real attention was given to the different kinds of tasks on which influence operates.

Conflict elaboration theory (Mugny, Butera, Sanchez-Mazas, & Pérez, 1995; Pérez & Mugny, 1996) postulates that social-influence dynamics make sense only if the nature of the task is considered. More specifically, the acquisition of knowledge and changes in cognitive capacities do not rely on the same influence processes as opinions, attitudes, or nonambiguous perceptual judgements. In a way that is analogous to the social developmental approach, conflict elaboration theory proposes that social influence is based on conflict. A divergence of judgements between self and other(s) involves subjective meanings, and through these meanings the divergence generated leads to a specific conflict between the source and target of influence. How this conflict is elaborated varies as a function of the source and also the task. This means that the divergence takes a different meaning for the target according to the nature of the source and the nature of the task.

One category of task distinguished by conflict elaboration theory includes those tasks which involve reasoning, learning, the perfection of competencies, knowledge acquisition, and accuracy judgements. Broadly, tasks of these kinds are labelled as 'aptitude tasks.' In these tasks, the target of influence knows that there is one correct solution (or at least an optimal solution) and that there exist other solutions which are objectively erroneous (or at least suboptimal). Lack of interindividual consensus is normally anticipated, since people who do not know the correct solution have a high probability of giving erroneous answers but not necessarily the same erroneous solutions. Given this divergence between responses, a major preoccupation for targets is to give the correct judgement. However, a social anchorage is entailed in aptitude tasks in the sense that those who do not give the correct solution are considered as incompetent, at least on that particular task. In other words, beyond the epistemic challenge and the acquisition of competence, the difference between being wrong and avoiding error assumes social value in terms of aptitude versus lack of aptitude. So people are motivated to give judgements that are as correct as possible and also to show that they are competent.

The conflicts that an individual may feel in aptitude tasks also take their meaning from a context of uncertainty. Without objective and secure means of determining the truth, individuals will remain uncertain about the correct response (Festinger, 1954). The solution to a task consequently relies on a social situation rather than a physical certainty, so that a belief is correct and valid as long as it is anchored in a group which is considered credible. The credibility of a source could be due to the numerical support it enjoys (as in the case of a consensual majority) but is essentially due to its competence. The more competent a source is perceived to be, the more it is considered to have credibility. Social comparison theories (cf. Collins, 1996) assume that in this kind of situation, because of uncertainty about the correctness of one's own point of view, everyone is motivated to compare the available judgements. In other words, in a situation where uncertainty is increased by a disagreement with a source, targets face a lack of information which leads them to compare their probable accuracy to that of the source (Butera, Mugny, & Tomei, 2000).

Table I. Conflicts dynamics taking into account competence and identity threat

	High competence source		Low competence source	
Comparison	Threatening	Not threatening	Threatening	Not threatening
High competence target	*Conflict of competencies*	*Informational interdependence*	–	*Lack of conflict*
Low competence target	*Informational constraint*	*Informational dependance*	*'downward comparison'*	*Conflict of incompetencies*

1.2. A SOCIAL INFLUENCE MODEL FOR APTITUDE TASKS

According to conflict elaboration theory, deciding on the nature of the conflict elaboration that arises from divergence of opinion in any given aptitude task requires recognition so that regulations of the conflict could be more relational and concern the self-esteem of the management through social comparison or more socio-cognitive and relevant to an epistemic motivation to discover the correct solution. In the first case, people seek to be better than others because of a need for high self-esteem or avoidance of low self-esteem. Indeed, feeling oneself to be better than others is positively linked to higher self-esteem (Brown, 1986). Comparing with others who are weaker on the relevant dimension allows people to believe that they are better, while reducing the perceived difference between self and superior others reduces the threat to self-esteem. The motivation underlying the comparison is self-enhancement. In the second case, targets would want to compare their responses to others' responses because of a need to increase their own competence. The motivation here is to become better than one is presently rather than better than others. Thus, social comparison allows people to determine their level of competence (Goethals & Darley, 1977) and their ability to solve the task (Wheeler, Martin, & Suls, 1997). In others words, the intrinsic motivation here is self-improvement.

Quiamzade, Falomir, Mugny, and Butera (1999) (see also Mugny et al., in press) have proposed a model based on the difference between relational and socio-epistemic approaches to resolving conflict in aptitude tasks as a function of:

(a) perception of the source's competence,
(b) perceived self-competence, and
(c) the threat that the source's competence generates for the target.

As may be seen in Table I, the combination of these three factors generates eight possible conditions of conflict between source and target of influence. This model is intended to explain, from a social-psychological perspective, the acquisition of knowledge and change in cognitive capacities through social influence.

Targets who believe themselves to have high competence would experience a conflict of competencies when confronted with a competent source. Since they feel competent and the judgements are different, to compare judgements with a competent source implies the possibility that their own judgements are erroneous, and so self-competence may decrease. In this case, they are motivated to affirm self-competence through differentiation from the source (Wicklund & Brehm, 1968), whatever is the nature of the judgements and their actual informational content. Thus, they cannot imitate or even give judgements inspired by those of the source and will instead tend to deny the validity of the source's position. They will engage in social comparison process with the aim of invalidating the source and thus affirm self-validation (cf. Butera, Gardair, Maggi, & Mugny, 1998).

A conflict of competencies can be avoided when targets conclude that judgements are complementary rather than mutually exclusive; for example, if the various judgements are accompanied by the possibility that there is more than one correct solution (Butera, Mugny, Legrenzi, & Pérez, 1996). In a situation of such informational interdependence the source's judgement is seen by the targets as the consequence of a different centration leading to an integration and coordination of points of view (cf. Butera, Huguet, Mugny, & Pérez, 1994). The judgements made by targets are viewed as probably adequate because of their competence, but they can become even 'more' correct if articulated with the source's judgement.

If the source is not competent, a competent target person will have no doubt about its own competence. This lack of conflict and lack of threat to the competence of targets allow them to retain a sufficient degree of self-esteem, since comparison with the source has the same effect as downward-comparison (Wills, 1981). Moreover, as the targets' competence is assured, they will not process the resolution of the task, since absence of doubt about self-competence makes more cognitive work superfluous.

When the source is competent and the targets are not, improvement in skills and capacities through social influence can be interpreted as learning situations in which the source should be an epistemic authority (the teacher) who possesses and dispenses knowledge, and the targets are the learners (the pupils) who do not know and need to learn.

The dynamics of informational constraint occurs when the competence of the source is perceived as a threat to the competence of the targets, and this prompts a social regulation to the conflict. The social comparison of competencies induced by the perceived high competence of the source reduces target's perceptions of competency and decreases their self-esteem. Imitation is an easy and rapid solution to reestablish lost self-esteem. From this point onwards, no further elaboration of the task is necessary, and targets disengage from the task. There is no learning or improvement in cognitive capacities, as may be the case when children are interacting with and solving tasks with other highly competent children (Mugny, De Paolis, & Carugati, 1984).

Informational dependence, on the other hand, occurs when the high competence of the source is perceived as a way of learning more about the task. In this case, imitation of the source is not just a means of restoring self-esteem but provides a real possibility of performing the task more effectively. Imitation is accompanied by genuine information processing which allows transfer and generalisation (cf. Winnykamen, 1990) of learned information to targets' response systems. Thus, informational dependence leads the targets of influence to imitate the competent source. But, in contrast to the case of informational constraint, because of lack of threat, they rely on the source's answers in learning how to resolve the task. This learning could concern either acquisition of knowledge or the improvement of cognitive capacities for processing the task.

The conditions for the classical learning model are not fulfilled if the competence of the source is low. When both source and target have low levels of competence, the conflict generated is a conflict of incompetencies (Butera & Mugny, 1995; Maggi, Butera, & Mugny, 1996). Given the incompetence of source, there is a high probability that the source's answers are erroneous. For this reason, it is not acceptable for targets to imitate the source. So, as a first step, targets seek to distance themselves from the source. But an erroneous source's answer does not provide any guarantee as to the correctness of the targets' own answers. It is not because the source is wrong that targets are right. On the contrary, the low competence of targets means that their answer is likewise probably wrong. This places targets in a situation of high uncertainty which generates a fear of invalidity (Kruglanski & Mayeseless, 1987). As the main objective in aptitude tasks is to affirm self-competence through discovery of correct solutions, targets are motivated by the fear of invalidity to examine and process more the task. This allows them to take into account more elements and points of view; targets examine the properties and characteristics of the task and the source's answer. The targets process the task in a mode of reasoning that involves divergent thinking (Nemeth, 1986), and this leads to a better performance and higher competence.

When the source's competence is evaluated within a competitive relationship, individuals are led to produce a downward comparison (Wills, 1981), that is a comparison that aims more at self-enhancement than at self-improvement.

2. Experimental Illustrations

2.1. SELF AND SOURCE'S COMPETENCE

An experiment on representations of the centimetre (Maggi, Butera, & Mugny, 1996) illustrates the dynamics typically observed when both targets' and sources' competence are taken into account. Subjects were all people who participated voluntarily in the experiment. They were males and females from Geneva (Switzerland), between 13 and 55 years old with a median age of 21 years. In the first part of this study, they had to estimate a set of vertical lines (of around 20 cm) and perceptual illusions (e.g., Müller-Lyer and the reversed T). This phase was

presented as a test of competencies in length estimation and was the means used to manipulate the first independent variable. The booklet in which they responded was then submitted to a fictitious data analysis, and participants were given bogus feedback about their competencies on a scale ranging from 0 (total lack of competence) to 100 (perfect). Half of the subjects were assigned a score of 24 corresponding to mediocre competencies, while for the other half the score assigned was 78 (i.e., excellent).

They then began the influence phase in which the task was to evaluate the length of a set of 12 lines (mean length: 20 cm). They were confronted with a consistently underestimating influence source asserting that the mean length of the lines was 9 cm. The source was a person who had received either a score of 24 (mediocre) or a score of 78 (excellent). In a control condition, subjects estimated this set of lines independently, and no feedback was given regarding their competence. Manifest influence was measured through subjects' estimation of the 12 lines, a positive influence being indicated by a shorter estimation of the lines' length, just as the source had underestimated them. Latent influence was measured by asking subjects to draw a line 8 cm in length. Latent influence, if any, consisted in drawing a longer line, on the basis of the inference that if 20 cm are judged to be 9 cm, implying that the source's representation of a given centimetre was longer than the subject's own. So latent influence was apparent if targets drew longer lines.

The analysis of manifest influence indicated two main effects. On one hand, subjects who were led to believe they had a low degree of competence were more influenced than those who believed they had a high degree of competence. On the other, the high competence source had more influence than the low competence source. Comparison between the experimental conditions and the control condition showed a robust manifest influence of the high competence source over the low competence subjects, whereas competent participants were not influenced by the incompetent source. As for latent influence, only the low competence subjects confronted with the low competent source significantly differed from the control condition.

This experiment thus pointed to two sets of results. At the manifest level, there was the classic effect of dependence (cf. Deutsch & Gerard, 1955; Allen, 1965): a high competence source was more influential than a low competent source but had influence mainly over low competence subjects. As for the drawing tack (latent influence), only low competence subjects confronted with the low competence source actually elaborated on the source's information. In this condition, the fear of invalidity arising from the subjects' incompetence, as well as from the impossibility of relying on the source's validity (i.e., conflict between incompetencies), led to a thorough validation (Moscovici, 1980) of the source's answer. This was shown by the fact that the representation of the length of the centimetre was affected for these subjects. They integrated the source representation within their own; indeed, they increased the length of the lines drawn.

These results are typical of those obtained in the majority–minority influence tradition in which compliance is regarded as the process induced by high status sources, and conversion (i.e., latent influence without manifest influence; see Moscovici, 1980) as the process induced by low status sources (see Moscovici, Mugny, & Van Avermaert, 1985; Moscovici, Mucchi Faina, & Maass, 1994). It appears from this point of view that a 'genuine' integration of the source's response is produced when subjects consider themselves to be as lacking in competence by comparison with the source. It remains to be determined under what conditions the high competence of a source or that of targets are also likely to induce an 'adequate' elaboration of the alternative information. To address these questions, the threat to identity potentially at work in the influence context must be taken into consideration.

2.2. FROM INFORMATIONAL CONSTRAINT TO INFORMATIONAL DEPENDENCE: AN EXAMPLE WITH ACQUISITION OF KNOWLEDGE

In order to bring about a change in a belief that is strongly anchored in the individual's personal experience or common sense by a conflict, it is assumed that the persuasive information must possess some validity. Indeed, sources of influence recognised by targets as more credible than themselves generally have more impact than sources without any credibility (cf. Hass, 1981). Communications which have sufficient validity to raise a question on the preexisting knowledge create a persuasive constraint that compels individuals to conform to the alternative claims (cf. Falomir et al., 1998). Insofar as individuals are motivated to elaborate valid knowledge (Insko et al., 1983; Kruglanski, 1989), they feel obliged to yield to the influence source, to recognise the lack of foundation to their own initial beliefs, and to admit that they were wrong. Now, in a context marked by perceived high pressure to conform to a highly credible source, a manifest change in the direction of the source of influence does not necessarily entail genuine appropriation of its point of view (cf. Wicklund, 1989). This gap between compliance and interiorization is due to the nature of the elaboration of the divergence between the targets' and sources' respective points of view (cf. Falomir et al., 1998). When the difference is explicit and unavoidable the target focusses primarily on social comparison with the source. Change in the direction of the source here has the function of restoring consensus (i.e., avoiding deviation from a source possessing the legitimacy to introduce a consensual point of view) without processing of the content *per se*. However, in the case of incompatible beliefs, there can occur a properly epistemic or socio-cognitive comparison of the intrinsic validity of beliefs involving a decentration process from the point of view of the target and a change toward the alternative, provided that the source possesses epistemic authority (cf. Ellis & Kruglanski, 1992) and that the context of social comparison does not entail a threat to the targets' identity.

The experience of being confronted with a different point of view not only raises doubts for targets about the intrinsic validity of their own judgements but

also questions their ability to formulate a competent judgement. A series of studies have dealt with situations in which identity concerns prevent the occurrence of deeper influence when they represent a threat to the targets' identity. This is the case when social comparison is highly evaluative and presupposes a hierarchy of abilities. In a study by Tafani, Mugny, and Bellon (1999), French university students (most of them women aged between 19 and 48) either had to compare their competence to that of a highly competent source (in a negatively interdependent manner; see below) or to evaluate just the competence of the source without judging themselves (i.e., without an explicit comparison). Results showed that when participants had been led to recognise themselves as having low competence compared to the highly competent source, they internalised that source's point of view less than when they judged its competence without any such interpersonal comparison. One way to avoid the handicap of credible sources is, therefore, to focus the attention of targets on the mere epistemic authority of the source and not on a comparison of competencies that is unfavourable to them. In other words, the integration of information from a high competence source is facilitated when epistemic authority (e.g., status linked to communicating knowledge as teachers) could legitimate differences in competencies. Targets are brought simply to accept the hierarchical relation of competencies and can centre their attention on the content of the message. In another study (Mugny, Tafani, Butera, & Pigière, 1998) subjects (students at a French university in first year of psychology, mostly women aged between 18 and 45) compared themselves with a source of either higher academic status than themselves (a university professor) or the same status (another university student). Participants were asked to compare themselves to the source with respect to four characteristics (competent, qualified, capable, and expert). Points were to be distributed in one of the two ways. Half of the participants divided 100 points between the source and themselves for each attribute. In this negatively interdependent form of comparison, what was given to one was lost to the other so that recognising the competence of the source meant denying self-competence. The other half could distribute up to a maximum of 100 points to themselves and separately a maximum of 100 points to the source; thus, in this independent form of comparison, it was possible to recognise both source's competence and self-competence. These two forms of comparison were intended to operationalize two modes of relationship between participants' competence and that of the source: negative interdependence in which acknowleding the source's competence threatened the targets' own versus independence which did not (see below). Results confirmed that participants internalised the source's point of view least when comparison was negatively interdependent with respect to a source recognised as highly competent.

Another study (Mugny, Tafani, Falomir, & Layat, 2000) highlighted these dynamics. Subjects were psychology students in the second year of psychology at a Swiss university. Of these, 75% were women, and they were aged between 19 and 40. The study was introduced during a course as a study of the ideal friend-

ship group. The students were first asked whether in an ideal friendship group it is necessary that there be no leader. The centrality of lack of leadership in the representation of the ideal friendship group (cf. Flament, 1982; Moliner, 1989) was confirmed since more than 90% of the participants responded that this was a necessary condition. The participants then read a description of a bogus study concerned with the link between satisfaction with group membership and the frequency of leadership acts within groups of friends. The parameters of both variables were summarised and subjects were asked to predict what percentages of such acts corresponded to different means for observed satisfaction.[1] The participants were then informed that the study had been carried out by a psychology student. The bogus results of the study were presented via a histogram which allowed an intuitive reading of the relation between satisfaction with group membership and the mean rate of leadership acts (cf. Mugny, Moliner, & Flament, 1997). The relation presented in this way, as well as the source's conclusion that the typical ideal friendship group is a group of friends in which there is a leader, were manifestly opposed to the participants' initial representations.

After presenting this contradicting information, the source's credibility (high vs. low) was introduced. It was explained that three professors had evaluated the student's degree dissertation according to the different criteria required by the university rules. The high credibility source achieved the maximum marks, and the European Credit Transfer System (ECTS) evaluation awarded was 'accepted with congratulations.' The low credibility source achieved an inadequate mark – the ECTS evaluation being 'not accepted.' Immediate manipulation checks revealed that the student's findings were seen to be valid when this source had high credibility and invalid when he or she had low credibility, and that participants disagreed strongly with the noncredible source but expressed moderate agreement with the credible source.

The participants were then asked to evaluate the source's competence and their own competence. As before, the mode of comparison was either negatively interdependent or independent. As regards the competence attributed to the source, analyses revealed a significant effect of source credibility; source competence was greater for the credible source ($m = 74.68$) than for the noncredible source ($m = 48.29$). As for self-competence, analyses also revealed a significant effect of source credibility. Self-competence was perceived to be higher when compared to the noncredible source ($m = 41.54$) than when compared to the credible source ($m = 33.13$). Thus, social comparison with the credible source was potentially threatening for the participants. They responded by attributing a lower status to themselves by comparison with that attributed to the self when dealing with the discredited source. Comparing the competence attributed to the self and to the source condition by condition showed that the difference was strongly significant in the credible conditions. When source credibility was low, the effect was marginally significant in the negatively interdependent condition while it was not significant in the independent version. Finally, when the comparison was negatively interde-

pendent, the correlation between self-competence and the competence of the source was necessarily equal to -1 insofar as participants followed the instructions. When the comparison was independent, this correlation ($r = 0.10$) was nonsignificant, and this was also the case taking the high and low credibility sources separately. Thus, in the independent comparison, participants did not link their own relative competence to that attributed to the source, while this was inevitably the case when the comparison was negatively interdependent.

Following the structural approach to social representations (cf. Abric, 1994; Moliner & Tafani, 1997), the influence of the source was measured, on the one hand, by the attitude expressed towards leadership in friendship groups and, on the other, by the degree of centrality of the belief in equality in an ideal friendship group. A modification along the dimension of centrality implies a cognitive restructuring of the representational field (i.e., an elaboration of the information provided by the source). Accordingly, the measure of approval of the position held by the source directly assessed manifest influence, while the measure of change of the representation assessed deeper influence.

The attitude measure consisted of five questions concerning approval of the source's point of view. Participants were asked to anticipate working in the future as psychologists and to indicate on five 8-point scales the attitude (i.e., whether to promote or to oppose the leadership) they would have regarding real friendship groups if they had to increase the satisfaction of their members. A measure of attitude was computed by averaging the answers to these five questions (a higher number indicating a more positive attitude toward leadership).

A questioning procedure developed by Moliner (1989) was used to test for deeper modification of the representation of the ideal friendship group. Four items were included which cast doubt upon either the source's representation of the friendship group or the prevailing representation. Following a brief description of a friendship group which varied according to the degree (low or high) of satisfaction of the members and the presence or absence of a leader, participants were asked to indicate on a 6-point scale to what extent each group constituted a typical ideal friendship group. An influence on the representation of the ideal friendship group was reflected by greater acceptance of the fact that a group with a hierarchical structure constitutes an ideal friendship group and correspondingly less acceptance of the fact that a group without a hierarchical structure can constitute an ideal friendship group. A higher rate referred to greater influence of the source on the representation of the ideal friendship group, and it corresponded to higher acceptance that ideal friendship groups need leadership.

Figure 1 represents the results for attitude change on an 8-point scale and for the change in the representation of the ideal friendship group on a 6-point scale. As regards attitude, the analysis revealed a main effect only for source credibility. The intention to promote leadership was greater when the source had high credibility than when source credibility was low. Thus, the influence on attitude depended exclusively on the credibility of the source and confirmed that the contradicting

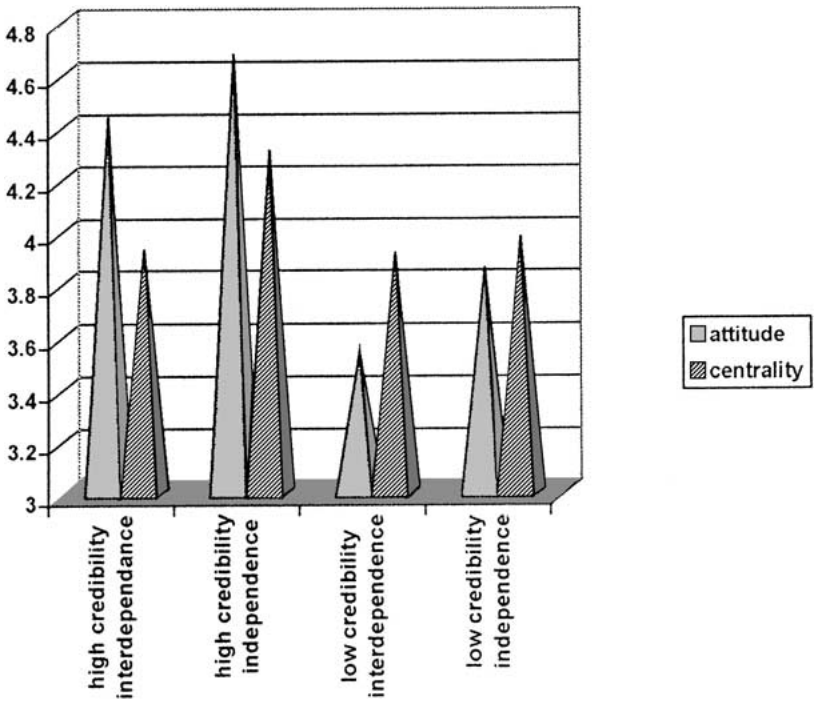

Figure 1. Attitude toward leadership and centrality of leadership in ideal friendship groups.

point of view attracted more approval when the source was credible than when it was discredited.

The analysis performed on the measures of centrality revealed a significant interaction between the mode of comparison and the source's status. Posthoc comparisons indicated that the influence was lower in the interdependent comparison than in the independent comparison when source credibility was high. This effect was not significant when source credibility was low. Moreover, the credible source had marginally more influence than the noncredible source when the comparison was independent.

These results indicated that adoption of a source's point of view was not directly proportional to the source's credibility, and that a positive handling by targets of the influence relation was essential. Attitudes toward leadership in friendship groups became more favourable when the information contradicting the initial belief was legitimised by an epistemic authority than when such an authority had denied its validity. However, although highly credible information creates higher persuasive constraint, the resulting influence does not necessarily bring about a genuine integration of the information such as would be manifested by a change in the central core of the representation. Indeed, as hypothesised, the influence of credible information was substantially less when participants had to compare themselves in a negatively interdependent fashion than when they did so in a way that was independent.

Additionally, however, the influence process is problematic when identity concerns are at stake; thus, this experiment showed that acquisition of knowledge-based skills is deeply embedded in a social relationship (see also Monteil & Huguet, 1999). To become psychologists, students need to increase their knowledge of the subject matter of psychology. To do so, they are not just assimilating the information they encounter during their studies. This assimilation, or alternatively the rejection of information, depends on the social relationship they form with the source of knowledge that provides it. Thus, a knowledge source with high epistemic status must be linked to a particular representation of a relationship of competence if one is to observe the integration of new contents in knowledge-based skills. These results highlight some of the conditions under which exposure to a highly competent source does not produce informational constraint, identity threat, and socio-cognitive disvestment but instead leads to genuine informational dependence and a reappraisal on the basis of the information provided (i.e., to an integration of the opposite point of view which results in the elaboration of new knowledge; see also Quiamzade, Tomei, & Butera, 2000, for similar results with respect to cognitive capacities and the acquisition of strategies for resolving anagrams tasks, with Swiss male and female subjects aged 19–62). This suggests that informational constraint is activated in situations where targets are obliged by the salience of an unfavourable social comparison to evaluate themselves as incompetent and to admit the superiority of the source.

This experiment has also shown that for a low credibility source the form of comparison has little effect. When the source is explicitly discredited, identity threat is apparently not present even in the negatively interdependent condition. It follows that in the negatively interdependent condition, the credible source differs from the discredited source with respect to approval of the source's point of view but not with respect to the central core of the representation. As regards the independent comparison, the results revealed that a credible source also had superior influence on the representation; however, this effect was only marginal. This somewhat intermediate status of the noncredible source in the independent condition can be attributed to dynamics pulling in opposing directions. On the one hand, and as hypothesised, explicit denial of the source's credibility would have had the effect of inhibiting influence since individuals would feel legitimised in maintaining their beliefs and disapproving of contradictory information invalidated by an academic authority. On the other, it has been argued that a conflict of incompetencies should lead to an increase in the latent influence of a source as incompetent as the targets. Now this condition is the only one in which the competence attributed to the source does not differ from that attributed to the self. Another study employing a different paradigm examined the effects of social comparison with a low competence source when individuals are led to attribute more or less competence to themselves in a context where the source is not explicitly discredited.

2.3. THE CONFLICT OF INCOMPETENCIES: AN EXAMPLE INVOLVING ACQUISITION OF COGNITIVE CAPACITIES IN A REASONING TASK

Hypothesis testing has been studied within both cognitive and social psychology. Following Wason's pioneering work (1960), a confirmatory 'bias' was identified in inductive reasoning, deductive reasoning, and many other tasks and situations (for a review see Evans, 1989). These lines of research seem to concur in the conclusion that confirmation is due to a lack of activation of alternative solutions to a problem. Indeed, this line of reasoning suggests that disconfirmation can occur when individuals are able to consider alternative solutions (Gorman & Carlson, 1989). Such an analysis led to the development of a research paradigm based on the idea that hypothesis confirmation and disconfirmation are reasoning processes that are specific to particular social situations, notably situations in which individuals are or are not confronted with an alternative hypothesis proposed by someone else.

In a series of studies (Legrenzi, Butera, Mugny, & Perez, 1991; Butera & Mugny, 1992), participants were set the task of discovering the rule underlying a given sequence of three numbers (e.g., 2, 4, 6). In this task, although the use of disconfirmation would be more diagnostic – as it allows a narrowing down of the generality of the hypotheses being tested – confirmation was used by the great majority of participants. In terms of diagnostic reasoning, proper hypothesis testing requires disconfirmation (cf. Popper, 1955). Confirmation only allows for an increased probability in the correctness of a hypothesis but without any certainty, whereas disconfirmation allows certainty that the tested hypothesis is false. In the experimental setting, subjects formulated a hypothesis and proposed a sequence of three numbers to test it after having been informed of the hypothesis and of the sequence proposed by either a majority (82%) or a minority (12%) of people who had already participated in the study. Results showed that during the influence phase more participants used the source's hypothesis in the majority conditions, whereas in an individual post-test more participants formulated new hypotheses when the minority used a confirmatory strategy. Although in all conditions confirmation appeared to be the dominant strategy, participants confronted with a minority formulated disconfirmatory sequences more often than did majority condition participants, although disconfirmation was proposed neither by the source nor by the experimental instructions.

These results suggest that confirmation would be more typical of confrontation with dominant, majority, or expert sources, whereas disconfirmation would occur when confronted with low status or low expertise sources. Butera, Mugny, Legrenzi, and Pérez (1996) were able to show that this is the case because majority sources exert a pressure toward considering one single answer whereas minority sources induce subjects to be open to alternative solutions. In other words, confrontation with a majority reproduces classical results concerned with confirmation bias, while confrontation with a minority increases the level of reasoning, as if influenced targets had mastered the cognitive tools necessary to behave in a more

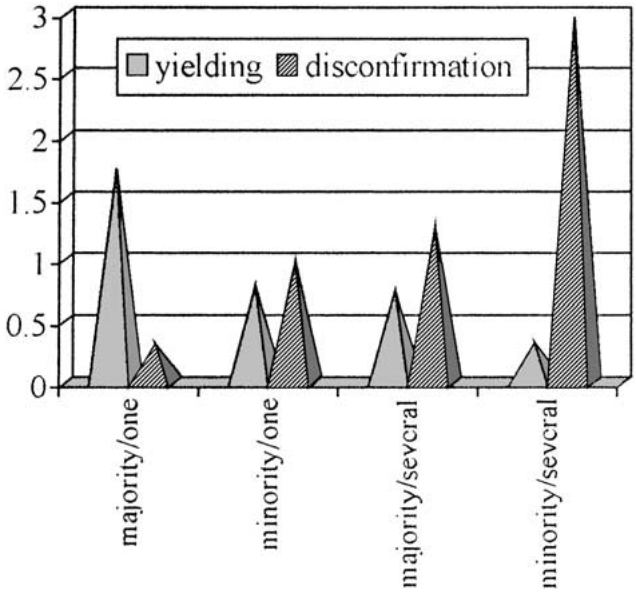

Figure 2. Mean yielding (max: 2) and disconfirmation (max.: 4).

adaptative way. In this experiment, participants (Swiss male and female high school students, aged 18–20) were confronted with either a majority or a minority source and were told that the task had either one single correct answer or several possible answers. Results (see Figure 2) show that when confronted with a majority, participants yielded more to the source's hypothesis and used confirmation more, in particular when this source corresponded with the explicit representation of the task as one requiring a single answer. When confronted with a minority, participants engaged in greater use of alternative hypotheses, and disconfirmation, in particular, when the low status of the source corresponded with the explicit representation of the task as allowing for a diversity of solutions.

If the source has low competence, targets cannot adopt its answer, since the probability is high that this answer is incorrect. Nevertheless, the target cannot discard this answer, since in problem solving, individuals are uncertain and are not sure that they have the correct solution themselves. Therefore, confronting a low status source in an aptitude task leads to a conflict of incompetencies (Maggi, Butera & Mugny, 1996), that of the source (who has no status as a competent authority) and that of the target who is judging under conditions of uncertainty. This would lead to a close examination of the task and to a decentration from the two existing points of view in search of an answer that could guarantee more validity. According to developmental social psychology, in order to acquire cognitive tools, it is necessary to have a social interaction, here with a minority, but this interaction is profitable only when there is a particular representation of the task. When a plurality of answers are considered, social interaction leads to an understanding

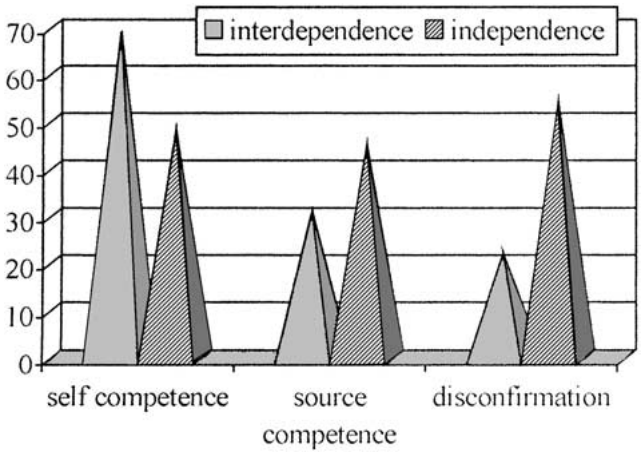

Figure 3. Mean competence attributed to the self and to the source, and disconfirmation rate.

that the position held by minority is one of the multiple possible solutions that could be provided. In this context it becomes more relevant to eliminate some of them than merely to adopt a single solution without knowing which one should be adopted. This, therefore, leads to an improvement in cognitive capacity for resolving the task adequately by increasing the degree to which disconfirmation is employed.

The hypothesis tested in another experiment (Butera & Mugny, 1995) was that the constructivist impact of a low status source requires that individuals do not perceive themselves to be much more competent than the source. The condition for occurrence of a real conflict of incompetencies would indeed be for individuals to doubt their own competence as much as that of the source. The prediction was that the disconfirmation rate induced by a low status source should be stronger if the participants regard their own degree of incompetence as similar to that of the source than if they emphasize their own competence relative to the source's incompetence. The procedure was similar to that used in previous experiments, except that here the participants (Swiss teenagers aged 13–16, half of whom were male and half female) were confronted only with a low competence source (a novice according to the cover story). After having been informed of the hypothesis proposed by the novice, participants were asked to compare their competence to the novice, under conditions either of negative interdependence or of independence (see above). This latter condition was intended to elicit a conflict of incompetencies, as it produced a fairer distribution of points which should reflect participants' doubts concerning their own competence as well as that of the source.

As represented in Figure 3, the results showed that, although participants generally gave themselves more points, in the negative interdependance condition they enhanced their superiority over the novice whose competence was denied. In the independent condition, participants did not establish such a large difference

between self and other. Both means were close to 50%, which is characteristic of a conflict between incompetencies. Whereas the correlation between points attributed to oneself and the novice was necessarily -1 in the negative interdependence condition, it was positive and significant in the independence condition. As regards hypothesis testing, participants in the negative interdependence condition used disconfirmation significantly less than those in the independence condition. The role of independence within the conflict of incompetencies is thus clearly demonstrated since individuals display high levels of constructivism when the source's competence is not threatening. When the source's competence is evaluated within a competitive relationship (negative interdependence), individuals are led to produce a downward comparison (Wills, 1981), which is to say a comparison that aims more at self-enhancement than at self-improvement (Wood & Taylor, 1991). In fact, although they evaluated their competence as much higher than that of the source, the disconfirmation rate remained very low.

3. Conclusion

One possible way to explain learning processes is to consider social influence dynamics in aptitude tasks. This theoretical focus, taken in parallel with the social development approach, leads to the view that the key concept in predicting acquisition of information or cognitive tools is socio-cognitive conflict. What generality does this view have, and how could it be applied?

Both adults and teenagers participated in the different experiments briefly described here. This variety of participants suggest that the processes demonstrated could probably be generalized to populations of different ages. Thus the application of conflict elaboration concepts to teaching might be carried out with a panel covering a wide age range. Moreover, the conclusions can also be adopted with confidence for children who, as social developmental research has shown, similarly exhibit cognitive progress under the equivalent conditions. However, our sample of subjects from different countries is thus far insufficient to elucidate possible national differences. It is possible that such differences modulate the social influence dynamics in aptitude tasks, but more research is needed.

Nonetheless, we can conclude that success or failure in solving aptitude tasks is highly dependent on the micro-social context in which cognitive tools and knowledge are acquired (cf. Monteil & Huguet, 1999). This means that in order to understand how people are able to learn or to produce cognitive processing at a higher level, it is essential to identify the social mechanisms that favour or impede the integration of information or the improvement of cognitive capacities. From the perspective of conflict elaboration theory, it is worth noting that making a judgement in a task in which aptitudes are at stake can give rise to a conflict at the level of identity as well as at the level of knowledge. In this kind of task, judgement implicates the use of knowledge or tools (such as rules of logic or strategies) that are highly valued with respect to aptitude. Therefore, judgements in these tasks

are social anchors, assigning the individuals who make them to hierarchically ordered and therefore more or less valued categories. Consequently, the acquisition of knowledge or the ability to function at a higher cognitive level are dependent on the kind of centration induced by the context. When a relational means of resolving the conflict is activated (i.e., the conflict occurs at the level of identity), there is a risk that any progress will be inhibited. These observations offer some ideas for the field of education in which it has already been noted that the perception of an incompatibility, of a negative interdependence, between points of view can be detrimental to classroom work. For instance, Johnson and Johnson (1991) pointed to the negative effects of 'debate' in learning settings. When pupils elaborate a judgement knowing that it will be evaluated exclusively in terms of aptitude, they tend to focus on their previous position in a defensive way; they reject alternative positions and are more interested in self-evaluation than in the manner in which they solve the task.

Results show that it is important to think about how information can be transfered from highly competent sources with epistemic authority to pupils. The distinction between informational constraint and informational dependence suggests that learning is not a question simply of transfer of information from teacher to learner. Conflict is generated by the difference between answers. Learners are active in the influence relationship since they are led to elaborate this conflict.

The manner in which conflict is elaborated (i.e., socio-cognitive vs. relational) is dependent on the learners' representation of the situation. This implies that an unequal hierarchical relationship can lead to learning and progress but not necessarily. In fact, the credibility of a source is not sufficient to induce the appropriation of information from that source. Credibility sometimes leads only to a superficial change in attitude without any real learning of content. It is when the social comparison is not threatening that the integration of knowledge provided by a credible source is successful. Studies in developmental psychology also show that confronting children with a correct model presented by adults is not sufficient to initiate the construction of new cognitive tools, in spite of the fact that the child may imitate the adult's responses. In confrontation with an adult, the regulation of conflict is relational rather than socioepistemic. Because the adult is considered as probably correct, children imitate without any real integration of information.

This dynamic can be countered by methods which challenge children's responses (e.g., Doise & Mugny, 1984) and get them to focus on the incompatibility between points of view and responses to the task and not on the difference in competence between themselves and the adult. In sum, the acquisition of new knowledge relies on situations in which the relationship with a competent source warrants a conflict of divergent responses and allows for a conflict elaboration not in relational but in socio-cognitive terms (i.e., it supports the construction of cognitive processing which integrates the knowledge provided by the source, such as occurs under conditions of informational dependence). For example, Mugny, Doise, and Perret-Clermont (1975, 1976) used such a method with conservation

of equality of length. Children without the capacity to conserve length classically centred their attention on one dimension of the task. Swiss nonconserving children were confronted with an adult in one of the two different ways. In one condition, the adult used the compensation principle. He showed the correct answer to the children. In the other condition, the adult responded with the opposite centration of that of the children. Here, if children changed their answers to imitate those of the adult, the experimenter also changed and took the initial answer of the children to counter the new centration of the children. Thus, the adult's answer was not correct but generated a socio-cognitive conflict between the two centrations. Post-tests were conducted with conservation of equality of length (i.e., the same task as that encountered in the confrontation with the adult) and inequality of length (i.e., a generalization task). In the first post-test, when the adult had indicated the correct answer, children were more likely to produce responses at a conserving level for conservation of equality; however, the greatest progress was shown for conservation of inequality when the adult had challenged children's responses with an opposite centration. That suggests that a socio-cognitive elaboration, promoting children' cognitive structure to the operational level and so allowing conservation, was more effective in this latter case in which the conflict was oriented to the incompatibility in answers.

In contrast, in the case of confrontation with a low credibility source, there are situations in which the context does not immediately induce a threat to self-competence. In such situations information is more directly processed to produce an increase in knowledge or cognitive capacities. Indeed, we have already seen that there is no identity threat when the source has low-level competence. One potential implication is that teaching is possible without a teacher. The teacher could choose another way of teaching than simply transmiting information to pupils. Remember that this form of teaching leads to a conflict whose resolution can be accomplished merely through imitation strategies, without any integration. Teachers could alternatively construct situations in which pupils are confronted with peers and have to resolve problems that are intrinsically linked to the information they have to acquire. The teacher then becomes an external supervisor of conflict induction. Each noncompetent pupil becomes a source of influence for other noncompetent pupils. When both target and source lack competence, the social developmental approach indicates an improvement in performance that can be anticipated as it has been found that children elaborate new cognitive tools based on the responses of other children as 'incompetent' as themselves. This situation can be interpreted as a conflict of incompetencies. In this case, it is the fear of invalidity which motivates targets, and the task is properly elaborated. Cognitive improvement is possible, as is shown by the use of diagnostic strategies in inductive reasoning, or by the case of underestimation of the centimetre in which there is integration of information provided by the source. Johnson and Johnson (1991) pointed out that in the case of 'controversy' (a divergence in points of view due to differences in the information that must be integrated), pupils become more uncertain and actively search for

more information. This leads them to integrate contradictory information and to achieve more elaborated levels of reasoning.

It seems that progress occurs only when there is a difference in responses resulting from a conflict of centrations (Doise & Mugny, 1984). It is not enough to construct situations of confrontation between incompetent pupils if opposition does not lead to differences in answers or to any conflict. For example, Swiss children between 5 and 7 year-old were confronted in pairs with a spatial decentration task derived from Piaget and Inhelder's (1948) 'Three mountains' task (see Mugny Levy, & Doise 1978; see also Doise & Mugny, 1984, chap. 6, exp. 2). These children first saw a village on a table. They then had to reproduce the same village on another table. To manage this, they needed to perform a spatial mental rotation. To solve the task correctly, children had to be able to compensate for the spatial rotation, and in this they had to decentrate from their own point of view. Those children who were unable to compensate mentally for the spatial rotation did not progress in the post-test even though they were both incompetent, because of a lack of conflict. But in the same task, it was sufficient to oppose the centrations of these children (see Doise & Mugny, 1979; see also Doise & Mugny, 1984, chap. 6, exp. 3) for them to be capable of solving the task correctly in the post-test. Indeed, when the children were positioned at opposite points around the table, they proposed different wrong solutions, which challenged them and generated a conflict, more specifically a conflict of incompetencies.

Endnotes

[1]This kind of content can be relevant in learning for such students, since psychology students can consider such a knowledge as typical of what students may have to learn. Indeed, students in another study believed that there is significant progress in the ability to predict satisfaction in groups from the first to the fifth year of studies in psychology.

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