

## The coordination of problem solving strategies: When low competence sources exert more influence than high competence sources

QUIAMZADE, Alain, MUGNY, Gabriel, DARNON, Céline

### Abstract

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QUIAMZADE, Alain, MUGNY, Gabriel, DARNON, Céline. The coordination of problem solving strategies: When low competence sources exert more influence than high competence sources. *British Journal of Social Psychology*, 2009, vol. 48, no. 1, p. 159-182

DOI : 10.1348/014466608X311721

Available at:

<http://archive-ouverte.unige.ch/unige:4009>

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### Abstract

Previous research has shown that low competence sources, compared to highly competent sources, can exert influence in aptitudes tasks inasmuch as they induce people to focus on the task and to solve it more deeply. Two experiments aimed at testing the coordination between self and source's problem solving strategies as a main explanation of such a difference in influence. The influence of a low *vs.* high competence source has been examined in an anagram task that allows for distinguishing between three response strategies, including one that corresponds to the coordination between the source's strategy and participants' own strategy. In Study 1 the strategy suggested by the source was either relevant and useful or irrelevant and useless for solving the task. Results indicated that participants used the coordination strategy in a larger extent when they had been confronted to a low competence rather than a highly competent source but only when the source displayed a strategy that was useful to solve the task. In Study 2 the source's strategy was always relevant and useful, but a decentring procedure was introduced for half of the participants. This procedure induced participants to consider other points of view than their own. Results replicated the difference observed in Study 1 when no decentring was introduced. The difference however disappeared when decentring was induced, because of an increase of the high competence source's

influence. These results highlight coordination of strategies as one mechanism underlying influence from low competence sources.

#### Key Words

Source competence, Coordination, Influence, Decentring

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Let us start with an example of our purpose. Imagine that three students, Jack, James and John are working together, as can be the case in an educational setting such as collaborative learning (e.g., Slavin, 1981; Aronson & Patnoe, 1997). Jack and James are both bachelor degree students whereas John is a master degree student. When discussing an issue, who, between James and John might influence Jack the most? The reader will probably think, as it has been thought for years, that John will influence Jack in a larger extent than James will. Indeed, in tasks assessing individuals' aptitudes, high competence source are usually believed to have the greatest influence. The high degree of competence or expertise constitutes a form of power that the source exercises over the target (French & Raven, 1959) or that reinforces the target's dependence to the source (Deutsch & Gerard, 1955).

However, research indicates that there can be a paradox in being confronted to a high competence source (Butera, Gardair, Maggi, & Mugny, 1998). On tasks in which aptitudes are at stake, individuals are also motivated to be competent, and being confronted to a high competence source can highlight the target's lower competence. In this case, the source may not appear so much as a provider of accurate information, but as inducing an upward social comparison that is problematic for the self (Morse & Gergen, 1970). Due to this comparison process, confrontation with a high competence source can activate a threat to the target's own competence (Major, Testa, & Bylsma, 1991), specifically if the source and the target have some proximity (Tesser, 1988), for example if they are similar on attributes related to performance (Goehtals and Darley, 1977), as scholar level can be (Lockwood and Kunda, 1997).

Given the potential for high competence sources to both provide information and to threaten the target's competence, what about their potential to exert influence ? According to some authors (cf. Pérez & Mugny, 1996), conflict of answers is a key mechanism in social influence. In this context conflict is not reduced at its classical notion (Deutsch, 1973), which means necessarily a conflictual or threatening relationship. Conflict here is conceived in a more general meaning as the divergence between answers. From there, it is the way it is subjectively elaborated which gives to it a problematic dimension (conflictual or threatening) or not. Social influence depends on the way the conflict is elaborated.

More precisely, it has been argued that conflict can be elaborated either in an epistemic way (focused on task understanding and coordination of points of views) or in a relational way (Quiamzade & Mugny, 2001). In the latter case, the target is mainly focused on social comparison of competencies and its implications for self-competence and self-esteem. This can result in a superficial influence only, like for example the mere adoption of the source's point of view (i.e., manifest influence) without any further elaboration of the conflict beyond the protection of the self competence. In the former case, targets are focused on social comparison of answers and the reasons of the divergence. They may try to coordinate their own answer with the source's answer to solve the task. This can result in a deep influence.

Because they often threaten self-competence, high competence sources have been shown to favour relational conflict regulation (cf. Mugny et al., 2003; Mugny, Butera & Falomir, 2001). Indeed, in a context in which a high competence source is threatening, people are motivated to reduce any discrepancy between their actual evaluation and the standards of comparison (Steele 1988; Tesser, 1988). Thus, the target is often led to imitate the source without any further form of elaboration (Mugny et al., 2001). Mere imitation appears to be the easiest way to reduce -in the emergency of the threat needing a solution- the gap between the self and the source: By reducing the differences of answers one reduces also the unfavourable

social comparison with the source. Moreover, threats to the self can lead to ruminations (see Koole, Smeets, van Knippenberg, & Dijksterhuis, 1999), which in turn can have a distracting effect (Baron, 1986). As a consequence, targets can be diverted from systematic processing (Chaiken, 1987) of the source's answers.

The paradox of competence is then that a highly competent source often exerts influence only at a superficial or manifest level but does not produce influence at a deep level (by deep level we mean real processing and transfer of the information provided by the source to the own system of beliefs or to the way to solve the task). However, such an influence is possible in some contexts. Indeed, research indicates that when a threat is not present, high competence source can exert influence beyond imitation or simple agreement. This is the case when social comparison is not salient (Tafani, Mugny, & Bellon, 1999), or when its nature does not obviously disadvantage the targets in terms of their relative competence (Mugny, Tafani, Falomir, & Layat, 2000).

Back to our example, what should then happen if John (the master degree student) suggests an answer which differs from Jack's (the bachelor degree student)? It is likely that the latter will adopt John's point of view, since John is more competent than himself. It is however unlikely that Jack thinks more deeply about this answer and about the conditions of its validity. This influence might then just be immediate and manifest, but should not induce a deep change in Jack's way of thinking, unless the threat resulting from John's competence is reduced.

In contrast, it has been suggested that compared to high competence sources, low competence sources can exert epistemic conflict elaboration, and then deep influence (cf. Mugny, Butera, Quiamzade, Dragulescu, & Tomei, 2003). Indeed, given their lack of competence, one would not expect low competence sources to have any overt influence in the form of imitation or mere reproduction of their responses (Hovland, Janis, & Kelley, 1953). In

line with these expectations, research has shown that people confronted to a high competence source tested hypotheses in a confirmatory way, whereas those confronted to a low competence source did not. On the contrary, participants in the latter condition tested hypotheses in a more disconfirmatory way, suggesting that they took into account alternative solutions (Butera, Mugny, & Tomei, 2000). In the same vein, in an estimation of length task, low competence participants who were confronted to a high competence source were influenced in their length estimations after information about the source's answers whereas those confronted to a low competence source were not. However, in drawing a length –a measure of deep influence- the latter showed an integration of the source's representation of length whereas the former did not (Maggi, Butera, & Mugny, 1996). In sum, low competence sources can obtain more influence than high competence sources in some cases, but at a different level, i.e., not at a manifest level but at a deeper one. However, the process through which low competence source exert deep influence remains unclear.

Pérez and Mugny (1993) hypothesised that the deeper influence resulting from the divergence with a low competence source might be explained in three ways. The first two mechanisms are based on an extension of the process observed in minority influence. Some results indeed suggest a similarity between minority influence dynamics and the way low competence sources achieve influence (Quiamzade, Mugny, Falomir, & Chatard, 2006). As an example, it has been found that a minority source has a higher impact than a majority source on novel hypotheses generation (Butera, Mugny, Legrenzi, & Pérez, 1996), just as it has been shown that a low-competence source has a higher impact than a high-competence source again on novel hypothesis generation (Butera, Caverni, & Rossi, 2005, Experiments 1 and 2). The similarity of these dynamics allow to consider that the influence of a low competence source derives from a *validation* process involved in the close examination of the source's proposals (Moscovici, 1980; Moscovici & Personnaz, 1980), and/or from *divergent*

*thinking* (Nemeth, 1986). Both explanations flow from the fact that minorities are assumed to be somewhat lacking in competence or to be wrong, in contrast to majorities, which are perceived to be more competent or to be in the right (Moscovici, 1980; Nemeth, 1986). The significance of consensus with respect to majority and minority influence implies a 'precision' heuristic (Axsom, Yates, & Chaiken, 1987; Kruglanski & Mackie, 1990) according to which majorities, more than minorities, are generally right (De Vries, De Dreu, Gordijn, & Schuurman, 1996; De Vries & De Dreu, 2001). In the case of aptitude tasks, namely, tasks in which competence is precisely the crucial point, the influence of low competence sources is analogous to the influence of a minority, the relevant factor being in both cases the low level of competence of the source (cf. Quiamzade, Mugny, Falomir & Butera, in press).

The third mechanism suggested as an explanation for the deep influence of low competence sources is the process of decentring and the coordination of points of views (i.e., epistemic conflict elaboration) that it can generate (Butera, Huguet, Mugny, & Pérez, 1994; see Gruber, 2000). Decentring is defined as a process which allows the target of influence to be aware of differences in points of view and thus to consider that each one represents a distinct strategy to solve the task according to the difference in points of view. The key point is that this process of decentring is supposed to facilitate influence through a coordination of strategies. Previous research on minority influence has already shown that an experimental induction of a principle organising the source's responses favoured deep influence when this strategy did specifically define the particular point of view of the source (Pérez & Mugny, 1986). More importantly, although majority influence is induced above all when the task asks for one single correct solution (cf. Brandstätter et al., 1991; Butera et al., 1994), minority has been shown to induce influence above all when participants believe there exist more than one solution to the task (Butera et al., 1996). Indeed, this allows for taking seriously into account



the minority (or low competent) point of view, and eventually for its integration or coordination with participants own point of view.

This explanation is grounded on developmental social psychology approach (cf. Doise & Mugny, 1984). According to this framework, creating a divergence in answers issued from a difference in point of views improves task resolution in children participants (see, for example, Ames & Murray, 1982; Mugny & Doise, 1978; Doise & Perret-Clermont, 1975-1976; Mugny, Giroud & Doise, 1978-1979). More precisely, these authors argue that children benefit from being confronted to a source that gives a diverging answer (i.e., when there is a conflict) because in such a case, they have to coordinate their own point of view with that of the source. In line with this idea, research has shown that conflict did not raise any improvement in task resolution when coordination of points of views was not possible (e.g., Doise & Mugny, 1975, Study 2) or when coordination was not necessary to reach the correct solution (Dalzon, 1991; Glachan & Light, 1982). This idea also finds support in research by Johnson & Johnson (1995, see also Tjosvold, 1998) showing a link between controversy (a form of conflict), and perspective taking (a form of decentring). The central role of coordination of points of views in developmental social psychology has however been questioned by Howe (1992) in children cognitive development. This author argued that cognitive development does not require the mutual construction of a superior response. For her, a mere divergence of responses is enough to generate cognitive development (Howe, Rodgers & Tolmie, 1990).

The present paper aims at examining the coordination of points of view as an explanation for low competence sources' influence compared to high competence sources' influence. More precisely, this research aims to determine whether the reason why low competence sources raise more deep influence than high competence sources is that the former raise more decentring and coordination of strategies.

Why such a process can be hypothesised? As a low competence source can not be followed at a manifest level because of its low competence, divergence and its reasons remain unsolved. The fact that a partner responds differently is nonetheless by itself informative for the target (Mettee & Smith, 1977; see also Goethals & Nelson, 1973). The target becomes aware of differences in points of views. Indeed, the fact some other responds differently indicates that there can be different ways to solve the task. The partner is then seen as a source of information that can help to solve the task in spite of its low competence, not through mere imitation of its answers but through careful scrutiny of its point of view. Targets are therefore led to engage in a more systematic analysis of the particular differences between their responses and those of the source and to examine the validity of each position. In other words, targets examine the different strategies underlying answers through a decentring process from their own position.

Thus, the deep influence of a low competence source (as compared to a high competence source) would result in the potentially paradoxical attempt to infer the strategy underpinning the source's responses and, if this succeeds, its coordination with the target's own strategy in the way to generate a better solution.

### Overview

Two studies were planned to show that the deep influence that incompetent sources obtain compared to competent sources is grounded on the higher propensity to coordinate strategies issued from different points of views when confronted to the former than when confronted to the latter. According to this general hypothesis, Experiment 1 aimed to demonstrate that the expected difference between incompetent and competent sources appears when the source provides a strategy that can be effectively coordinated with targets' own strategy (compared to a strategy that does not allow for a coordination). Indeed, if the difference is due to the coordination that appears to be more pronounced when people are

confronted to low competence sources, it should appear only when such coordination is objectively possible. In this first experiment students were confronted to the answer from a high vs. low competence source. Depending on a second experimental manipulation, this answer made salient an underlying strategy that was helpful for solving the task (i.e., coordination was possible) or that was unrelated to it (i.e., coordination was impossible).

The second experiment aimed to demonstrate that the expected difference between low and high competence source can be eliminated when coordination of points of view is explicitly induced. Indeed, if the difference is due to a decentring process that low competence sources induce by default compared to high competent sources, the coordination should also appear when people confronted to a high competence source are made aware of the benefits of decentring. As a consequence, a such procedure should make up for the gap between the two sources. Thus, in Experiment 2 students were confronted to the answer of a high vs. low competence source whose strategy was always helpful for solving the task. However, a procedure of decentring was introduced for half of them, but not for the other half. This procedure made salient the benefits of the coordination of points of view, making people to consider that the others' divergent answers may constitute a source of information that has to be taken into account and coordinated with their own answers in order to solve the task.

## Study 1

### Method

#### *Participants*

One hundred and thirty two second year psychology students took part in the experiment. This experiment was carried out within an introductory social psychology class. With an average age of 21.58 years ( $SD = 1.84$ ), the sample consisted primarily of females

(111 females, 21 males). As gender does not produce any differences neither in the present experiment, nor in Study 2, this variable is no longer discussed.

### *Procedure and material*

Each participant carried out the different tasks alone during an individual session. The experiment was presented as a test of a material for a questionnaire that would be employed in future studies on performance in verbal tasks. It was indicated that before moving on to such studies, it was important to test the material to determine whether the tasks to be performed later by real participants were indeed clear and doable.

Participants were first asked to provide various demographic details (age, sex), as well as their previous experience as a word-game player and perception of their own word-game ability (see below). They were then presented with two tasks to complete. The order of the two tasks was counterbalanced. One of these two tasks (the “F-task”) involved finding and ticking as quickly as possible three words containing the letter F in a piece of English text (see Table 1). In this text, six words contained the letter F (in order of occurrence: finished, files, of, of, scientific, of). It is well known in psycholinguistics that in this type of task the propensity to detect letters is more pronounced for some kinds of words than for others (see, for example, Healy, 1994); words such as “of” are less often detected. Participants had to tick three words in the text and then rewrite them in boxes provided for the purpose. Note that the participants are French speakers whereas the text was in English. This makes the task to be understood as a letter detection task avoiding to focus too much on the meaning of words, making believable the purpose of the task.

The second letter game was extracted from Quiamzade, Tomei and Butera (2000, Experiment 2). This game was inspired by the task used by Nemeth and Kwan (1985). It is an anagram task in which five chains of five letters each are presented successively (see Table 2). Following each of these chains, participants must indicate as quickly as possible the first

three-letter word that comes to their mind. The letter chains are presented in such a fashion that one group of three letters clearly stand out. This three-letter group forms a French word in the usual left-to-right direction of reading but also a word in the reverse direction. With the letter chains provided words are most frequently detected using the letters in the usual cultural reading direction, i.e., from left to right (Quiamzade, et al., 2000).

After carrying out these two first tasks, experimental manipulations were introduced, namely high or low level of source's competence, and presence or absence of a relevant strategy underlying source's responses. Participants were told that other students (i.e., individuals with the same academic status) had already completed these tasks and that they would be informed of the answer given by one of them (the source). The source's competence level was thus manipulated on the base of evidence that students only rarely play this kind of game. Thus, for half of the participants, the source was presented as "a student who is a member of several clubs (scrabble<sup>1</sup>, '*des chiffres et des lettres*'<sup>2</sup>, and letter search<sup>3</sup>) and who reports playing such games *daily*". For the other half, the source was presented as "a student who is not a member of any letter game clubs, and who has reported only *rarely* playing such games."

A pilot study carried out with 15 third year psychology students revealed that none were club members and all played only rarely. On the basis of this pilot study, participants were unlikely to possess any expertise or particular experience in letter games; the low competence source should therefore be similar to the targets while the high competence source should be markedly superior.

The second experimental manipulation concerned the presence, in the source's responses, of a usefull vs. not usefull strategy, i.e., a strategy that objectively could or could not be used in the main anagram task that they had to complete later at the end of the experiment (this later anagram task would be a string containing 10 letters, with which

participants should build words using different strategies: using letters in the direction of usual reading, in the reverse direction or mixing both; see below for more details of the main anagram task). For the manipulation of usefulness of the source's answer, participants were informed of the source's responses to only one of the two tasks they just had performed. In a condition (*with usefull strategy condition*), they were made aware of the source's responses to the five-letter anagram task: Participants could read that the source had consistently given words using groups of three letters *in the reverse* of the usual reading direction (see Table 2), which is one of the possible strategies in the anagram task. In the other condition (*without usefull strategy condition*), they learned of the source's responses to the F-task: They could read that the source had ticked the three prepositions (i.e., 'of').

In both conditions, the source was credited with responses that were divergent from those the participants had previously given in these tasks. The source's answers thus contradicted the participants' answers. However, the crucial difference between conditions is that the strategy of using letters in the reverse direction of reading is the only one that could be used by targets in the main anagram task. This strategy can not only be reproduced as it stands (i.e, imitated), but can also be integrated in such a way as to coordinate it with the target's own strategy, namely using also the letters in the direction of reading, such coordination resulting in a mixed strategy (cf. Quiamzade et al., 2000). In contrast, the choice of the prepositions 'of' does not lend itself to the inference of a strategy applicable to anagrams even if it was also divergent from participants' choices.

Participants then had to solve the main task, namely an anagram task (see below). This involved forming as many words as possible with as many of the letters provided as they wished. They finally had to answer some self-report questions. Details on the target task and the self-report questions are presented below.

### *Dependent variables*

*Demographic details and controls.* Before starting solving the task, participants were asked to provide various demographic details (age, gender), and to indicate if they were members of one of the clubs of letter games (scrabble, “*des chiffres et des lettres*” and letter search). They were also asked how frequently they played letter games of this type (1 = rarely, 2 = regularly, 3 = daily). This was done to check that participants’ degree of experience with the tasks to be used was low. Still before starting the task, participants were asked to answer on a 7 points scale (from 1 = no to 7 = yes) to the following two questions: “Do you think that members of clubs are more competent at these games than those who are not members?” and “Do you think that those who play daily are more competent than those who play rarely?”. These questions aimed at checking that players would be seen as more expert than non-players.

*Influence.* Influence was measured as the amount of words formed using different strategies that participants produced in the final anagram task. This task consisted in providing participants with ten letters (CREIUTNALB). They were told they had three minutes to form as many words as possible from those ten letters, with the sole restriction of not using any letter twice in the same word. They received a sheet with sixty boxes in which they were to write down their words. In this task, the source’s strategy in the five-letter anagram task was informative because it was applicable to the main task. On the contrary, the source’s response to the F-task was not relevant to this task. The measures were based on the frequency of use of the three possible strategies in the composition of words. As mentioned earlier three word-finding strategies were possible on this task. Indeed, words could be in the normal reading direction (forward strategy, i.e., the strategy initially used by participants), in the reverse direction (backward, i.e., the strategy used by the source), or a combination of the two (a

mixed strategy). The backward strategy corresponds to an imitation of the source's strategy. The mixed strategy corresponds to a coordination of self and source's strategies.

*Competitiveness.* In order to assess the perceived competitiveness of the situation, participants were asked to answer, at the very end of the experiment, to the following question: "Do you feel like being in competition with the student whose answers have been given to you", on a 7 points scale (1 = no, 7 = yes).

*Originality.* To ensure that originality of the source does not account for results as an alternative explanation, one question was asked to assess how creative participants thought the source was on the same 7 points scale. The participants had to answer to the following question: "Do you think that other people would answer like him/her?".

*Perception of source strategy.* Three questions were designed to assess the perception students had of the other person's strategy. The questions were as follow (1 = no, 7 = yes): "For the letter game to which you were given another student's answers", (a) "do you think there are strategies for generating different kinds of answers on this task?" (b) "do you think that the other student had a strategy for responding?", (c) "If yes, did you understand this strategy?".

*Perceived utility of the strategy.* Two other questions assessed the perceived utility of the two first tasks (1 = no, 7 = yes): (a) "Do you think the strategies for responding in the game involving finding three Fs in an English text can help finding answers in the game in which you have to construct the maximum number of words with the ten letters?" (b) "Do you think that strategies for responding in the game involving finding three-letter words in a series of five letters can help in finding answers in the game in which you have to construct the maximum number of words drawing on ten letters?".



*Attempt to understand the source's strategy.* Finally, a question aimed at measuring participants' motivation to understand the source's responses followed: "When you became aware of the other student's answers, did you try to understand his/her response strategy?".

### *Hypotheses*

First, imitation as the reproduction of the source's backward strategy should be more pronounced when the targets are confronted to the high competence source rather than to the low competence source. Second, if the low-competent source's impact is based on a mechanism of coordination of strategies, the difference between the low competence source and the high competence one on mixed strategy will appear only when the source's strategy can be coordinated by the target with its own strategy into a new integrated strategy. Thus, the production of mixed words should be higher when the targets are confronted to the low competence source compared to the high competence source, when the target has been made aware of the responses of the source to the five-letters anagram task. The difference should not appear when the target received the responses of the source on the F-task, resulting in an interaction between source and relevance of the source's strategy.

### *Results*

*Responses to the initial tasks.* Most participants supplied the expected words in the five-letter anagram task, namely, used the letters in the left-to-right reading direction ( $M = 4.76$  out of a maximum of 5,  $SD = 0.71$ ). Likewise, in the F-task, the majority chose the words "finished", "files" and "scientific" ( $M = 2.66$  out of a maximum of 3,  $SD = 0.49$ ). In all conditions there was therefore a conflict (i.e., a divergence of answers) between the participants' own spontaneous responses in the two tasks and the judgments provided by the source<sup>4</sup>.

*Participants' level of expertise.* As expected on the basis of the pilot study, participants had only scarce experience of letter games. Only one participant reported being a member of one club. Moreover, participants indicated they played letter games fairly rarely ( $M = 1.02$ ,  $SD = 0.12$ ). In fact, only two participants reported playing such games regularly (including the participant who was a club member)<sup>5</sup>, one participant provided no answer and 129 chose the 'rarely' answer.

*Manipulation check: Source's perceived level of competence.* Participants did think club members were more competent than non-members ( $M = 5.61$ ,  $SD = 1.47$ ). Indeed, the observed value differs from the mid-point of the scale,  $t(131) = 12.61$ ,  $p < .001$ . Likewise, participants agreed on the fact that competence is linked to the level of practice ( $M = 6.22$ ;  $SD = 1.08$ ). Again, the difference from the scale mid-point is significant,  $t(131) = 23.63$ ,  $p < .001$ . These measures clearly show that the manipulation is effective in inducing different level of source's competence. On this basis and to avoid overburdening the text, hereinafter we will refer to the source that was a club member and played daily simply as the "high competence source" and to the source that was not a club member and played only rarely as the "low competence source".

*Competitiveness.* A 2 source's competence (high vs. low) x 2 source's answers (anagram vs. F-task) ANOVA was carried on the competitiveness measure. Analysis revealed a main effect of source's level of competence. Participants felt more competitiveness with the high competence source ( $M = 2.39$ ,  $SD = 2.04$ ) than with the low competence source ( $M = 1.66$ ,  $SD = 1.14$ ),  $F(1, 128) = 6.45$ ,  $p < .02$ ,  $\eta^2 = 0.05$ .

*Originality.* The same analysis on the originality measure did not produce any significant effect,  $M_{overall} = 3.02$ ,  $SD = 1.74$ .

*Perception of a strategy.* A 2 source's competence (high vs. low) x 2 source's answers (anagram vs. F-task) MANOVA was run on the three items about the perception of a strategy underlying the source's responses. This analysis revealed a main effect of the latter manipulation, namely the task for which the source's responses had been provided,  $F(3, 124) = 8.74, p < .001, \eta^2 = 0.18$ . As expected, when the source's responses were related to the five-letter anagram task, participants were more likely to conclude that strategies did exist for generating different types of answer ( $M = 5.38$   $SD = 1.39$ ) than when it was the F-task ( $M = 4.55, SD = 1.84$ ); they also reported that the source followed a strategy in a larger extend than when it was the F-task (respectively,  $M = 5.31, SD = 1.58$  and  $M = 4.18, SD = 1.92$ ), and that they better understood this strategy ( $M = 5.35, SD = 2.22$ ; and  $M = 3.43, SD = 2.32$ ); all  $F_s(1, 126) > 8.90$  and  $p_s < .003, \eta^2 = 0.07$ . Neither the main effect of source's competence nor the interaction effects were statistically significant on these measures.

*Perceived utility of the strategy.* A 2 source's competence (high vs. low) x 2 source's answers (anagram vs. F-task) x 2 questions of perceived utility of the strategy (for the anagram vs. for the F-Task) ANOVA has been performed with the last factor as repeated measures. This analysis revealed a main effect of the perceived utility of the strategy  $F(1, 127) = 110.10, p < .001, \eta^2 = 0.46$ . Participants viewed strategies as more useful for the three-letter words task ( $M = 4.76, SD = 1.88$ ) than for the F-task ( $M = 2.69, SD = 1.62$ ). The main effect of the task for which they received the other's answer was marginally significant,  $F(1, 127) = 2.94, p < .09, \eta^2 = 0.02$ . Participants who received the source's responses to the five-letter anagram task tended to perceive more utility ( $M = 3.91, SD = 1.18$ ) than participants who received the source's responses to the F-task ( $M = 3.54, SD = 1.42$ ). Finally, this difference was qualified by an interaction between the task concerned by the questions about perceived utility and the sources's answers to the anagram vs F-task,  $F(1, 127) = 7.86, p < .006, \eta^2 = 0.06$ . It indicated that the above difference was observed only for participants

whose source's answers referred to the anagram task. In other words, the initial anagram task was more likely to be considered as useful when a strategy was available ( $M = 5.23$ ,  $SD = 1.66$ ) than when it was not ( $M = 4.30$ ,  $SD = 1.97$ ),  $F(1, 127) = 8.61$ ,  $p < .004$ . This was not the case of the F-task (respectively  $M = 2.59$ ,  $SD = 1.50$  and  $M = 2.78$ ,  $SD = 1.73$ ). Taken together, these effects confirm the overall success of the manipulations.

*Influence.* Given that almost all participants produced real words (and less than one non-word on average), and that the results are comparable whether or not the non-words are taken into account, the results presented here are based on all the words generated. A 2 source's competence (high vs. low) x 2 source's answers (anagram vs. F-task) ANOVA<sup>6</sup> has been performed on each of the three possible strategies for generating words (see Table 3): normal direction of reading (forward), reversed direction (backward), and a combination of the two (mixed). As far as the forward and backward strategies were concerned, no effects appeared. Thus expectations about imitation were not confirmed.

As far as the mixed strategy was concerned, a main effect of source competence  $F(1, 128) = 6.77$ ,  $p < .01$ ,  $\eta^2 = 0.05$ , as well as an interaction between source competence and the presence or absence of a strategy were observed,  $F(1, 128) = 4.31$ ,  $p < .04$ ,  $\eta^2 = 0.03$ . The main effect indicated that participants were more likely to generate mixed words when confronted to a low competence source ( $M = 11.34$ ,  $SD = 3.86$ ) than when confronted to a high competence source ( $M = 9.53$ ,  $SD = 4.24$ ). As can be seen in Table 3, however, the interaction refined the nature of this effect. Consistent with our main hypothesis, the advantage for participants faced with the low competence source only occurred when the source offered a usable strategy, namely, when the source's responses related to the five-letter anagram task,  $M = 12.17$ ,  $SD = 4.04$  for the low competence source and  $M = 8.90$ ,  $SD = 3.80$ , for the high competence source,  $t(128) = 3.28$ ,  $p < .001$ . No differences were observed when the participants were provided with the source's responses on the F-task (respectively  $M =$

10.45,  $SD = 3.50$  and  $M = 10.09$ ,  $SD = 4.58$ ). It is interesting to note that post hoc comparisons between F-task and five letters words task conditions suggest that confronted to the low competence source, participants exposed to a usable strategy tended to generate more mixed words than those who were given the responses of the source to the irrelevant F-task,  $t(128) = 1.76$ ,  $p < .08$ . In the high competence source condition this difference did not reach significance at all.

*Attempt to understand the source's strategy.* With respect to the question of whether participants had sought to understand the source's strategy, the ANOVA with the same experimental design as before revealed a main effect of task,  $F(1, 128) = 21.40$ ,  $p < .001$ ,  $\eta^2 = 0.14$ . Participants reported trying to understand the source's response more when it concerned the five-letter anagram task ( $M = 4.74$ ,  $SD = 2.29$ ), than when it referred to the F-task ( $M = 2.96$ ,  $SD = 2.15$ ). However, this main effect was qualified by a significant interaction,  $F(1, 128) = 8.20$ ,  $p < .005$ ,  $\eta^2 = 0.06$ . When the source gave a usable strategy, participants tried to understand the source's strategy more when the source had a low competence ( $M = 5.23$ ,  $SD = 2.18$ ) than when it had a high competence ( $M = 4.17$ ,  $SD = 2.32$ ),  $t(128) = 1.96$ ,  $p < .06$  or when the low competence source did not offer a usable strategy ( $M = 2.39$ ,  $SD = 1.95$ ),  $t(128) = 5.38$ ,  $p < .001$ . Additionally, participants in this latter condition tried to understand the source's strategy less than those similarly not offered a usable strategy by a high competence source ( $M = 3.50$ ,  $SD = 2.22$ ),  $t(128) = 2.16$ ,  $p < .04$ . The remaining difference did not reach statistical significance.

## Discussion

Study 1 was designed to test the effect of a confrontation to a high vs. low competence source on the coordination of strategies. It was argued that high competence source would

raise more imitation (manifest influence) than low competence source, but that the latter would induce more deep influence. Moreover, it addressed the question of whether the low competence source influence would occur whatever the answer this source gives, or whether it would occur only when the given answer is relevant and useful to the task. Results did not support the first hypothesis since participants did not imitate more the high competent source than the low competent one. This lack of imitation will be discussed in the general discussion. However, the low competence source gave rise to more coordination of strategies (deep influence) than the high competence source. Indeed, more mixed strategies were used after the confrontation to a low competence source than after the confrontation to a high competence source. More importantly, the interaction indicated that this effect occurred only when the source's answers were relevant to the task, i.e. useable by the participants. This last result supports an interpretation in terms of decentring process and coordination of points of view. Indeed, the condition for low competence source to exert influence is that there is a possibility for the targets to coordinate their own answers with those given by the source. In other words, low competence source raised more influence than high competence source when this source provided information that was potentially useful to solve the task coordinating strategies.

It is worth noting, however, that some alternative explanations of the results could be raised. More specifically, the relevance of the source's answers was manipulated using answers to different tasks, and this could imply possible covariates related to the nature of the task. One could for example argue that what mattered was the difficulty of the tasks, or other characteristics inherent to the nature of the two tasks, but not the relevance of the source answers, and then, the usefulness of the coordination of points of views. The first goal of Study 2 was to address this issue in a different way and by maintaining the type of task constant.

More specifically, in Study 2, the nature of the task remained constant, and the necessity of decentring was manipulated. Coordination of strategies is the consequence of decentring and this process is supposed to be present when targets are confronted to a low competence source but not to a high competence source. Thus it was expected that when such a process is explicitly induced, the high competence source should benefit from it to the same extent as the low competence source and thus obtain the same influence, which should in the present task result in a stronger use of the mixed strategy.

## Study 2

As coordination of strategies is supposed to result from decentring from one's own point of view, in Study 2 both the necessity of the decentring process and the source's competence were manipulated, and usefulness of the source's answers was kept constant. Except some important differences (see below) the general procedure was the same as in Study 1.

## Method

### *Participants*

Ninety-five second year psychology students took part in the experiment. The experiment was carried out within an introductory social psychology class. Twelve participants did not have enough time to complete the three letters word task, and another participant produced more than three letters words which made no sense regarding the furnished letters, suggesting that he/she did not understand the task. These thirteen participants have been dropped from the analysis. With a mean age of 22.05 years ( $SD = 3.34$ ), the remaining sample (eighty-two participants) consisted primarily of females (72 females, 10 males).

### *Procedure and material*

Contrary to Study 1, the present experiment was carried out in a classroom context, namely, with all students at the same time. Again, the experiment was presented as a test of a material for a questionnaire that could be employed in future studies. Same bogus information as in Study 1 was given. Participants were told that one task was about accuracy in perception and two others were about performance in verbal tasks.

Participants were first presented the alleged perceptual task which introduced the first experimental manipulation. The principle of the task was similar to Quiamzade (2007; see also Gruber, 2000) decentring task. This task was introduced in order to induced the belief that despite opposing judgements, answers can be complementary rather than contradictory, and that other's answers may be helpful to solve the tasks, i.e., they may benefit from coordinating own answer with other's answer.

Specifically, participants were shown for one second a stimulus consisting of the bottom half of a drawing resembling a fish tail. Their task was to guess what the complete drawing was. The whole drawing actually represented a mermaid but because little time was given to scrutinize the partial drawing, most of the participants answered that the drawing was of a fish or part of a fish (two said it was an eel and another one answered a pike).

They were then presented with the whole drawing which was a mermaid. They were informed that the partial drawing had been displayed before to other students who were testing the material too and that most of them answered a fish. To discourage participants from thinking that the task was constructed in a way to prevent them from guessing the correct answer, it was stressed that a clue was available to fulfil the task: Some of the mermaid's hair was visible in the partial drawing of the fish's tail. This procedure allowed participants to understand that they just missed the clue that would have hinted to the correct response.



In one condition (*no decentring condition*) it was added that “sometimes when multiple answers can be given to a task (correct or incorrect), answers of people can be different from each other”. In the other condition (*decentring condition*) participants were instead informed that the other half of the drawing had been displayed to other students and that most of them answered that the drawing was “a woman”. To stress the need of decentring from one’s point of view and then coordinating opposite answers, it was added that “sometimes when multiple answers can be given (corrects or incorrect) answers of people can be different from each other. However, such a divergence does not imply that judgments are necessarily contradictory. Indeed, as it is the present case, with answers like “fish” and “woman”, no answer is less correct than the other”.

Participants then answered manipulation checks about the decentring task (see below). These manipulation checks were mixed with others bogus questions about the task making believable that the aim of the experiment was to test the material (e.g., “did you get enough time to see anything?”, “did the colours of the drawing bother you?”). They then moved to the five letter task which was the same as the one used in Study 1, i.e., the chains of five letters in which they were to indicate as quickly as possible the first three-letter word that came into their mind. As participants were all doing the task at the same time, one change was introduced. Indeed, they had a limited time to do it (15 seconds). As a consequence, some of them (twelve of the thirteen dropped participants) had not enough time to end the task properly. They gave two or less words on five, impeding that they clearly developed the expected strategy, i.e., words using the letters in the usual reading direction. Moreover one did not understand the task and gave words with more than three letters (the last dropped participant).

The second experimental manipulation, namely the high vs. low level of source competence, was introduced at this moment. This manipulation was the same as in

Experiment 1: For half of the participants, the source was presented as a student who was a member of letter game clubs and who reported playing such games daily. For the other half, the source was presented as a student who was not a member of any letter game clubs, and who had reported only rarely playing such games. Participants were asked to report if they were members of a club and how frequently they played letter games of this type (1 = rarely, 2 = regularly, 3 = daily). None of the participants was member of a club and most of them indicated that they rarely play letter games. Only two of them indicated they played regularly.

Then, participants were given the source's responses to the five-letter anagram task. As in Study 1, participants could read that the source had given words using groups of three letters *in the reverse* direction of reading, a strategy that was useable in the subsequent anagram task.

Participants then had to solve the same main anagram task as in Study 1. Indeed, they had to form as many words as possible with as many of the 10 letters provided as they wished, with the sole restriction of not using any letter twice in the same word. They finally had to answer some questions (see below), including at the beginning of the set of questions a manipulation check on the source's competence.

#### *Dependent variables*

*Influence.* As in Experiment 1, influence was measured as the amount of words using the three different possible strategies (forward, backward and mixed) that participants gave in the final anagram task.

*Decentring manipulation check.* Participants were asked to indicate on a seven point scale (1 = no and 7 = yes), how much they thought that knowing the answer of someone else brings information that can help solving the tasks correctly. They were also asked how much they thought that when someone answers differently, this can be helpful to solve correctly the task.

*Source's competence manipulation check.* In Experiment 1, the measure used concerned beliefs about the source characteristics and was assessed before the manipulation. As a consequence it may not concern the source itself, i.e., the provider of the diverging answers, but its category. We then proceeded differently here. Participants had to estimate the other student who gave the backward using words strategy in the first anagram task (the five letters available to compose three letters words) on four items. They had to indicate how much the source was competent, qualified, capable and expert, on scales from 0 to 100 %.

*Competitiveness.* In order to assess the perceived competitiveness of the situation, participants were asked to answer on a 7 points scales (1 = no, 7 = yes) the two following questions: "Do you feel in competition with the student whose answers have been given to you?" and "Was it important for you to try to be better than him/her?".

*Demographic details.* At the end participants were asked to provide their age and gender.

### *Hypotheses*

First, imitation (i.e., the use of the source's backward strategy) should be more pronounced when the targets were confronted to the high competence source than to the low competence source (however, in accordance with results of study 1 a such imitation was no more expected *in casu*). Second, if the low-competent source's impact is based on a mechanism of coordination of strategies, the difference between the low competence source and the high competence source should appear only when the decentring procedure is not introduced. The difference should disappear when such a procedure is introduced, making participants aware of the benefits of taking into account the source's strategy even when this source is highly competent.

## Results

*Responses to the initial task.* Most participants supplied the expected words in the five-letter anagram task, namely, using the letters in the left-to-right reading direction ( $M = 4.71$  out of a maximum of 5,  $SD = 0.56$ ).

*Manipulation check of the decentring.* A 2 source's competence (high vs. low) x 2 decentring (with vs. without) MANOVA on the two measures of the decentring process revealed a main effect of the decentring manipulation,  $F(2, 76) = 4.62, p < .02, \eta^2 = 0.11$ . The participants who received the decentring information thought that knowing the answer of someone else brings information that can help solving the task correctly ( $M = 5.54, SD = 0.87$ ) more than participants who did not receive such information ( $M = 4.80, SD = 1.62$ ),  $F(1, 77) = 6.37, p < .02, \eta^2 = 0.08$ . The difference was marginal for the second item (respectively  $M = 4.32, SD = 1.66$  and  $M = 3.75, SD = 1.41$ ),  $F(1, 77) = 3.89, p < .06, \eta^2 = 0.05$ .

*Manipulation check of the source's competence.* The same MANOVA computed on the four measures of competence ( $\alpha = 0.86$ ) revealed a main effect of the source's competence. The high competent source was seen as more competent, capable, qualified and expert ( $M = 87.27, SD = 11.46$ ), than the low competent source ( $M = 67.27, SD = 16.25$ ),  $F(4, 75) = 31.47, p < .001, \eta^2 = 0.63$ . The difference was significant for each item at  $p < .001$ .

*Competitiveness.* The same analysis of variance did not reveal any significant result on competitiveness. The perceived level of competition was very low (overall  $M = 1.46, SD = 1.01$ ) and so was the importance, for participants, to be better than the other (overall  $M = 1.55, SD = 1.12$ ).

*Influence.* Given that almost all participants produced real words (and less than one non-word on average) and that the results are comparable whether or not the non-words are taken into account, the results presented here are based on all words generated.

A 2 source's competence (high *vs.* low) x 2 decentring (with *vs.* without) ANOVA has been performed on each of the three possible strategies for generating words (see Table 4): normal direction of reading (forward), reverse direction (backward), and a combination of the two (mixed). As far as the two first strategies were concerned, no effects appeared. Thus expectations about imitation were again not confirmed. This result replicated the one obtained in Study 1.

Significant effects appeared on the mixed strategy. First, participants generated more mixed words when confronted to the low competence source ( $M = 12.49$ ,  $SD = 3.85$ ) than when confronted to the high competence source ( $M = 10.90$ ,  $SD = 3.87$ ),  $F(1, 78) = 3.98$ ,  $p < .05$ ,  $\eta^2 = 0.05$ . Second, when the decentring information was provided, participants generated more mixed words ( $M = 12.61$   $SD = 3.29$ ) than when it was not ( $M = 10.78$   $SD = 4.32$ ),  $F(1, 78) = 5.23$ ,  $p < .03$ ,  $\eta^2 = 0.06$ . Finally, the interaction was also significant,  $F(1, 78) = 4.07$ ,  $p < .05$ ,  $\eta^2 = 0.05$ . As in Study 1, when no decentring information was provided, participants confronted to the low competence source generated more mixed words ( $M = 12.38$ ,  $SD = 4.08$ ) than the ones confronted to the high competence source ( $M = 9.10$   $SD = 3.98$ ),  $t(78) = 2.84$ ,  $p < .006$ . In line with our hypothesis, this difference disappeared when decentring information was provided to the participants (respectively,  $M = 12.60$ ,  $SD = 3.86$  and  $M = 12.62$ ,  $SD = 2.75$ ). It is interesting to note that post hoc comparisons showed that participants confronted to the high competence source used more mixed words in the condition in which decentring was induced than in the situation in which such a procedure was not introduced,  $t(78) = 3.04$ ,  $p < .003$ . This difference did not appear for the participants confronted to the low competence source.

## Discussion of experiment 2

Study 2 was designed to test the effect of a confrontation to a high *vs.* low competence source on the coordination of strategies. First, it was argued that the high competence source

would raise more imitation (manifest influence) than low competence source. Moreover, the possibility was tested that the high competence source does not obtain such coordination because it does not induce the target to decentring and to coordination of points of views. As in Study 1, results did not support the first hypothesis. However, it was confirmed that the low competence source gave rise to more coordination of strategies (deep influence) than the high competence source, but only when no decentring procedure was experimentally induced. Indeed, results indicated that more mixed strategies were used after the confrontation to a low competence source than after the confrontation to a high competence source, but the interaction indicated that this difference appeared only when no decentring procedure was induced, whereas the decentring induction raised the high competence source' influence and allowed this source to obtain the same influence as the low competence one. This last result supports an interpretation in term of decentring process and coordination of points of views.

### General Discussion

Several theories, including French and Raven's (1959) perspective on power, the views of Hovland, Janis and Kelley (1953) on credibility, and those of Deutsch and Gerard (1955) on informational dependence, predict that high competence sources are more influential than low competence sources. Though starting from a different perspective, several theories of social influence (Moscovici, 1980; Mugny et al., 2003; Nemeth, 1986) also regard majorities (as high competence sources) as capable of exercising a stronger influence than minority (as low competence sources). According to this research, this superiority is expected to appear at an overt level and to occur mainly through an imitation process (cf. Moscovici, 1980). Contrary to these views, the results of both Experiments indicated that a high competence source did not exert greater influence than a low competence source. The hypothesis on imitation was then disconfirmed.

This result is similar to that obtained by Nemeth and Kwan's (1985) using a similar paradigm with majority and minority sources. Indeed, these authors found that the majority was not more likely to have its strategy adopted than the minority. The first contribution of this paper is then to highlight that as majorities, high competence sources do not always exert a large and overt imitation.

Why should this be the case? Three different explanations should be examined. First, it is important to note that the words that can be produced with the backward (opposite to the reading direction) strategy are overall less numerous than those using the mixed strategy. Imitating in this situation would thus have meant using a counter-intuitive strategy. Competent source influence is not supposed to induce a counter-intuitive way of thinking (e.g., Butera et al., 2000). Instead, its influence is expected to be manifest, direct, and often characterized by a short-term imitation. Second, one might add, as McGuire (1985) has emphasised, that competent sources have difficulty exerting influence when their competence is not associated with other factors that might increase the tendency sometimes shown to conform to a source with superior expertise (cf. Hass, 1981), for example legitimacy (Tyler, 1990).

A third explanation, in line with previous work (e.g., Mugny et al., 2003; Pérez & Mugny, 1993) could be that social comparison with a competent source is often a threat to self-competence (Mugny et al., 2003), even if it is not always the case (Collins, 1996; Mugny et al., 2000). To compare with an expert source implies an upward comparison, a comparison which is unfavourable to the target (Morse & Gergen, 1970). This comparison is likely to generate negative feelings (Pleban & Tesser, 1981) and to focus the target towards a relational management of self-esteem, because of the threat that the success of the other can generate (Tesser, 1988). In this threatening situation, people may focus on the defence and protection of their self-competence (relational conflict regulation) rather than on the content of the

message (epistemic conflict regulation). This would be consistent with the fact that in Study 1, participants felt more in competition with a high competence source than with a low competence source. However, this result must be taken very cautiously. Indeed, the mean values are particularly low in both conditions. Furthermore, in Experiment 2 no differences appeared, suggesting a floor effect.

At least, the results indicate that high competence sources do not always exert influence. On the contrary, they show that low competence sources can in some circumstances be the ones that exert more influence, via a coordination of points of views.

Apart from confirming the effectiveness of the manipulation, the questions used in Study 1 about the source's strategy gave support to the idea that participants were able to perceive the potential for a help in the other person's answer. Participants did appear to discern the presence of a strategy differing from their own but with the potential of being coordinated with their own when such a strategy was available. This underlines that in this situation, participants seem to be conscious of the possibility of coordinating points of views. This also indicates that, by examining the responses of the source, the target is able to infer that the position occupied by the source reflects a distinct perspective, and that the coordination of the different perspectives makes possible a better mastery of the task.

Nevertheless, recognising the presence of a strategy in the source's responses, if necessary, is not by itself sufficient to produce coordination. When a usable strategy is accessible and participants are aware of it, the desire to understand the strategy still depends on the nature of the source. This desire is strongest when the source has the same low level of competence as the participants rather than when the source has greater competence. In sum, Study 1 showed that the situation in which the attempt to understand the source's answer is the strongest is when the source's answer presents a strategy that can be useful for the main task and the source is of low competence, i.e., not more competent than the target.



More importantly, our results indicated that influence appears in the same condition, namely, when a low competence source presents a usable strategy. This is not the first experiment showing that a low competence source can sometimes exert more influence at a deep level than high competence sources (see, for example, Maggi et al., 1996). As detailed in the introduction however, it remains hard to know what the mechanism responsible for this influence is. We have discussed that for children, Howe (1992) suggested that the mere divergence was enough to induce cognitive development. Part of the literature however argued that the reason why children can exert progress on peers, as suggested in the previous paragraph for low competence source, is through the possibility of coordination of points of views (e.g., Doise & Mugny, 1975, 1984; Glachan & Light, 1982).

In the present experiment, coordination of points of view is possible via the use of a mixed strategy. Indeed, this strategy is a combination of the initial self-strategy (forward) and the source's strategy (backward). If influence of a low expertise source is based on the coordination of strategies issued from diverging points of views, then this influence should appear on mixed words and only when the source answer does contain a strategy that can be coordinated with self-strategy. Results of Study 1 showed that when a useable strategy was available, i.e., the five letters task answers, mixed words production increased when the source was lacking competence compared to a competent one. This difference did not appear when the source's answers concerned the F-task, namely, a task which is unrelated to the target task. This confirms that the influence of the low competence source stands on the coordination of strategies underlying the responses.

Experiment 2 replicated and extended findings of Experiment 1. It suggests that the difference between high and low competence source in term of influence appears because targets are by default more inclined to coordinate strategies when confronted to a low competence source than when confronted to a high competence source. The difference

between the two sources disappeared when the competent source benefited from the decentring procedure making people aware of the fact that other's different answers can be helpful to solve the task and that coordination of answers is a useful strategy to adopt. Moreover, the introduction of the decentring did not change anything for participants confronted to the low competence source, suggesting that confronted to such a source people coordinate by default their strategies when available.

To summarize, people actually coordinate their point of view with that of the source either when the source is not threatening per se (when the source is of low competence) or when the competence of the source is presented not as a threat, but as a help for solving the task (when decentring is presented as a useful strategy).

Some limitations of the present research may be however mentioned. Notably, it is important to underline that the mixed strategy remains the strategy used most often in every condition. It seems that mixed words are also used independently of coordination because of their availability in the task. An interesting contribution would then be to test the same ideas on a measure that could not be used spontaneously without the source's influence.

Moreover, one could argue that the reason why low competence sources exerted more influence than high competence sources is actually the perceived similarity between self and the source on competence level and/or related attributes (Goethals & Darley, 1977; Goethals & Klein, 2000). This is not inconsistent with our interpretation. Indeed, the low competence source's influence implies a similarity between the source and the target, but a similarity at a *low* degree of competence. Research has shown that similarity does not always lead to influence. For example, when source and target are both of high level of competence the source does not produce any influence (Maggi et al, 1996; see Quiamzade & Mugny, 2001 for a theoretical account). At best, opposition between competent peers produces defensive imitation (Quiamzade, 2007). Examining the level of similarity as a possible moderator of the

influence of a low competence source would be an important question to address in future research.

Despite these limitations, the present experiments allow a better understanding of the influence processes in aptitude tasks. The present research confirms that sources that are lacking in competence can have a deeper influence than competent sources, even though they do not possess any power over the targets. Furthermore, this research shows that one of the possible routes through which this influence operates is the coordination of strategies underpinning different answers, with the proviso that these are relevant to the task at hand.

Let us finish by coming back to our opening example. What can be expected from a disagreement between Jack (bachelor degree student) and John (master degree student)? This should not make Jack change his own way of thinking and solving the problem. The dynamic should however be different in the case of a disagreement with James, another bachelor degree student. In this latter case, indeed, and since James is not more competent, Jack might examine James answer deeply, trying to understand his strategy of problem solving (i.e., an epistemic regulation). This might result in deep influence, namely a change in problem solving strategy based on the coordination between the two strategies. Based on other research, one can expect Jack to benefit from this interaction in term of cognitive progress (Doise & Mugny, 1984), and learning (Darnon, Butera, & Harackiewicz, 2007; Darnon, Doll, & Butera, 2007).

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*Table 1. Text in English for the F-task as it appears in the material to participants*

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FINISHED FILES ARE THE RE-  
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IC STUDY COMBINED WITH THE  
EXPERIENCE OF YEARS

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*Table 2. Letter sequences and French words corresponding to the normal reading direction and its reverse (attributed to the source).*

	<i>Letter sequences</i>	<i>Reading direction</i>	<i>Opposite of reading direction</i>
<i>Item1</i>	qt ces	ces	sec
<i>Item2</i>	rit zn	rit	tir
<i>Item3</i>	r sel p	sel	les
<i>Item4</i>	m sac i	sac	cas
<i>Item5</i>	iq nos	nos	son

*Table 3. Number of words as a function of strategies, Study 1 (standard deviations in brackets)*

<i>Competence of the source</i>	<i>With useable strategy</i>		<i>Without useable strategy</i>	
	<i>High</i>	<i>Low</i>	<i>High</i>	<i>Low</i>
Normal reading direction strategy	2.20 (1.81)	2.14 (2.02)	2.32 (1.89)	2.82 (2.17)
Reverse direction strategy	4.13 (2.57)	4.43 (3.11)	3.88 (3.05)	4.30 (2.95)
Mixed strategy	8.90 (3.80)	12.17 (4.04)	10.09 (4.58)	10.45 (3.50)

*Table 4. Number of words as a function of source's competence and decentring induction, Study 2 (standard deviations in brackets)*

<i>Competence of the source</i>	<i>Without decentring</i>		<i>With decentring</i>	
	<i>High</i>	<i>Low</i>	<i>High</i>	<i>Low</i>
Normal reading direction strategy	1.90 (1.21)	2.05 (1.83)	2.10(1.58)	2.40 (1.57)
Reverse direction strategy	2.70 (2.25)	3.57 (2.86)	3.90 (3.25)	3.40 (2.74)
Mixed strategy	9.10 (3.98)	12.38 (4.08)	12.62 (2.75)	12.60 (3.86)

## Notes:

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<sup>1</sup> A well known game that involves forming words from sets of letters.

<sup>2</sup> A TV game-show, on French language television (there is a British version called “Countdown”), in which one task is to form the longest possible word with a given set of letters.

<sup>3</sup> This refers to a game that does not actually exist, but the mention of which is made to provide greater coherence to the study as a whole in the eyes of the participants, because the study also includes a task in which they must search for and tick occurrences of a particular letter.

<sup>4</sup> Results are identical when only the participants producing the five words in the normal reading direction or those choosing the three words other than ‘of’ were kept in the analyses.

<sup>5</sup> The statistical effects on dependent variables reported below remain comparable when these participants are excluded from the analysis.

<sup>6</sup> When including the order of tasks as an independent factor it appears a main effect of order,  $F(1, 124) = 4.40, p < .04, \eta^2 = 0.03$ . More mixed words are generated when the F-task is presented first and the anagram task in second ( $M = 11.21, SD = 4.24$  against  $M = 9.61, SD = 3.87$  for the opposite order). This effect is probably simply due to a distraction effect showing that adding the F-Task between the important task in the situation to coordinate (the five letters anagrams) and the last anagram task they may forgot a little their own strategy and then use less the coordination strategy. As order does not interact with other variables and does not interest us in itself, it will no be discussed further.