

Short Note

**Conflict between incompetences and
influence of a low-expertise source in
hypothesis testing**

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Abstract

In a 2-4-6-like reasoning task, 69 subjects tested hypotheses following exposure to a low-expertise source proposing an alternative hypothesis. Subjects compared self- and source's competence either independently or interdependently. Results show that interdependence leads subjects to assert self-validity and the source's invalidity, and to test hypotheses through confirmation. Independence produces a conflict between incompetences, i.e. doubt concerning self- and source's validity, leading to disconfirmatory testing.

INTRODUCTION

Numerous studies on majority and minority influence have been carried out on performances in problem solving tasks. Social influence can act upon performance in decision making (Burnstein, 1992) or embedded figures tasks, the quality of word associations, the organization of information in anagram tasks (Nemeth, 1986), as well as inductive reasoning (Legrenzi, Butera, Mugny and Pérez, 1991). These studies suggest that majorities exert influence through convergent thinking: subjects imitate the source or elaborate solutions derived from its answers. In contrast, subjects openly distance themselves from the answers of a minority and engage in divergent thinking that integrates multiple points of view, leading to more elaborate solutions (Legrenzi *et al.*, 1991). Such dynamics rest on the inferences made by subjects: that a majority's answers are correct whereas a minority's are wrong (Nemeth, 1986).

The main characteristic of such tasks is that they rest on uncertainty: subjects know that one solution is more valid than any other but they don't know which one (Pérez and Mugny 1993). If a proposition is considered a reliable source of

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information, it makes any search for alternative solutions unnecessary. The hypothesis proposed by the conflict elaboration theory (Pérez and Mugny, 1992) is that when a solution to a problem comes from a supposedly incorrect source, subjects experience a conflict between incompetences. Faced with a task to solve, they are uncertain. To adopt an unlikely solution (that of the source) may result in the fear of invalidity (Kruglanski, 1989) which brings subjects to openly take their distances (Butera and Mugny, 1992). Nonetheless, they remain uncertain, as rejecting the source's answer does in no way guarantee the validity of their own answer. It is the conflict between incompetences, that of the source and that of the subjects, that leads to engagement to a process of validation (i.e. a search for the conditions and limits of validity of the answers) resulting in decentration from a unique mode of answering, evaluation of alternate solutions and the creation of a mental space in which these alternatives may be taken into account.

The hypothesis tested by the following experiment is that the constructivist impact of a low-expertise source supposes that subjects do not perceive themselves as much more competent than the source. We indeed know that in tasks calling for an objective answer, a low-status source exerts no influence whatsoever if its credibility is explicitly denied (Brandstätter, Ellemers, Gaviria, Giosue, Huguet, Kron, Morchain, Pujal, Rubini, Mugny and Pérez, 1991). The condition for a real conflict between incompetences to occur would indeed be for subjects to doubt their own competence as much as that of the source. Our prediction is that the constructive effect of the low-expertise source in such an aptitude task will be stronger if the subjects regard their degree of incompetence as close to that of the source than if they emphasize their own competence relative to the source's incompetence.

This prediction will be tested through an inductive reasoning task, inspired by Wason's (1960) 2-4-6 problem, in which subjects are asked to propose a solution and test its validity after having been given a solution advanced by a source; they may test their hypothesis by confirmation or disconfirmation. In this type of experimental paradigm, confirmation is the most frequent answer, although disconfirmation is the more diagnostic strategy. In various experiments, a low-status source (a minority) has been shown to induce disconfirmation (a constructivist response as it is not only rare but also not derivable from the source's response) at a much higher rate than a source of a higher status (a majority; Butera and Mugny, 1992; Legrenzi *et al.*, 1991). The purpose of the present study is to demonstrate that this constructivist effect is due to a conflict between incompetences.

Method

Subjects

Sixty-nine subjects (36 boys and 33 girls) participated in the experiment. Their age was 13 to 16 (median = 14).

Procedure

A questionnaire presented a problem concerning the organization of trips by a travel agency that proposed a package tour on the theme of 'visit two cities'. The problem consisted in testing a given criterion to account for why customers choose these

two cities more than any other with a view to programming another package of two cities that would be as successful as the initial pair (two Swiss lakeside cities). The criterion 'two lakeside cities' was assigned to subjects, and they were asked to support it by writing a short advertisement, to which they could feel committed. They were then informed that an employee believed that the criterion was 'two expensive cities'. This then assured a divergence between the subjects and the source. The employee in question was presented as a low-expertise source, namely an apprentice who had just started working in the agency.

Independent variable

After having read the criterion they were to stand by and the one proposed by the apprentice, subjects were asked to compare themselves to the apprentice on four characteristics: competence, qualification, skill, expertise. This comparison aimed to operationalize two types of relations between subjects' competence and that of the source. In the negative interdependence mode ($N=34$), for each characteristic, subjects were asked to share a total of 100 points between the source and themselves: the apprentice's incompetence is then the condition for the subjects' competence (what is given to one is denied to the other). In the independent mode, ($N=35$) subjects had 100 points to attribute to themselves and another 100 points for the apprentice; this condition was intended to elicit a conflict between incompetences. This experimental manipulation has proved to induce a fairer distribution of points (Mummendey and Schreiber, 1983); in a task dominated by uncertainty, this distribution should reflect the subjects' doubts concerning their own competence as well as that of the source.

Main dependent variable

Following this comparison, subjects were asked to solve three problems. First of all, they were to designate two cities amongst a proposed eight with the idea of using them in a telephone poll to test the correctness of their criterion. The two cities were chosen twice, first from a set of eight cities where the travel agency already had conventions and then from another eight cities where the agency planned to make arrangements. The two sets of cities corresponded to a $2 \times 2 \times 2$ design involving three criteria: lakeside or not, expensive or cheap, big or small (Swiss or foreign in the second series). The criteria were indicated for each city, in order to avoid geographical ignorance (e.g. St. Moritz: Swiss-expensive-no lake). Thus subjects had a total of four cities containing their criterion and another four that did not.

Then subjects answered on a series of seven-point scale questions regarding their representation of the conflict, the task and their specific aims in hypothesis testing.

The last page presented a numerical problem. Subjects were asked to discover the rule underlying a triad of numbers (3-5-7) and to propose a triad in order to test their hypothesis (Legrenzi *et al.*, 1991). Additional information was that the rule 'ascending odd numbers' was wrong and that the triad 11-13-15 also corresponded to the rule to be found. This part of the experiment involved an open-ended response format, as the subjects themselves both formulated their hypothesis and devised a triad to test it. No information was given about any source. This exercise is in this sense a generalization item.

The main measure is the strategy used by the subjects to test their hypothesis: confirmatory or disconfirmatory. Confirmation occurs when the cities or the numbers are all compatible with the hypothesis; disconfirmation occurs when at least one of the cities (or one of the numbers) is not compatible with the hypothesis.

RESULTS

Manipulation check

Means of the points attributed to oneself and to the apprentice for the four items of the comparison phase (Cronbach's $\alpha=0.84$) show a self/other main effect (MANOVA $F(1/67)=96.56, p < 0.001$) as well as an interaction with the independent variable ($F(1/67)=53.98, p < 0.001$). Subjects generally give themselves more points; however, in the negative interdependence condition, they enhance their superiority ($M=70.71$) over the apprentice, whose competence is denied ($M=29.29; t/33=10.45, p < 0.001$). In the independent condition subjects do not establish such a large difference between self ($M=50.34$) and other ($M=44.36; t/34=2.14, p < 0.05$). Both means are close to 50 per cent, which is characteristic of a conflict between incompetences. Whereas the correlation between points attributed to oneself and the apprentice is logically -1 in the negative interdependence condition, it is significantly positive ($r=0.61, p < 0.001$) in the independence condition.

Hypotheses testing

Table 1 shows for each of the three items the frequency of subjects using a confirmatory strategy and a disconfirmatory strategy (the difference in n is due to missing answers).

Table 1. Frequencies of confirmation and disconfirmation

Comparison:	Interdependence		Independence	
	Confirmation	Disconfirmation	Confirmation	Disconfirmation
Problem 1	27	7	18	17
Problem 2	26	8	14	21
Problem 3	27	1	16	15

Results show that subjects evaluating themselves and the apprentice independently test their hypotheses through disconfirmation more so than subjects in the interdependence condition. This is the case for the first two exercises (respectively, $\chi^2(1)=4.784, p < 0.029$ and $\chi^2(1)=7.978, p < 0.005$). The strength of this effect is emphasized by the fact that it also occurs in the numerical generalization exercise that is free of any reference to a source and involves an open-ended response format ($\chi^2(1)=12.769; p < 0.0004$).

Representations of task and conflict

Answers to the post-experimental questionnaire show that the two experimental conditions exerted an influence beyond performance and that they led to two distinct

forms of reasoning. Asked if in such a task it is important to 'follow one single idea all the way', subjects in the interdependence condition gave a firmly positive answer ($m=5.21$), whereas independence subjects did not appear to be so sure ($m=3.69$; $F1/67=11.168$, $p < 0.001$). The opposite effect was found for the item 'it is important to be open to every possible solution': subjects in the independence condition were more favourable ($m=6.26$) to this idea than the subjects in the interdependence condition ($m=4.62$; $F1/67=16.458$, $p < 0.001$).

It is worth noting that in this task all subjects considered that 'it is important to reach a correct answer' ($m=5.74$; no significant difference between conditions). Differences appeared when subjects were asked if 'it is important to find a better answer than other people': interdependence subjects are more inclined ($m=5.71$) to believe so than the subjects of the independence condition ($m=4.37$; $F1/67=7.017$, $p < 0.01$).

As for the questions concerning the aim of testing, subjects in the two conditions appear to be driven by different motivations. In the interdependence condition, subjects aimed to 'prove that my idea was correct' ($M=6.12$) and to prove that 'the idea of the other was incorrect' ($M=4.94$) more than subjects in the independence condition ($M=5.17$, $F1/67=9.900$, $p < 0.002$; $M=3.86$, $F1/67=5.516$, $p < 0.03$). In the independence condition, subjects aimed to 'prove that the idea of the other was correct' ($M=3.40$) and that 'my idea was incorrect' ($M=2.43$) more than subjects in the interdependence condition ($M=2.38$, $F1/67=6.419$, $p < 0.02$ and $M=1.62$, $F1/67=8.576$, $p < 0.005$). In the interdependence condition the subjects' concerns are self-confirmation and other's invalidity. In the independence condition subjects express a relative doubt about their own correctness as well as the incorrectness of the source. In fact, the aim of 'finding out which among alternative ideas is correct' is more that of independence subjects ($m=5.69$) than that of interdependence subjects ($m=3.88$; $F1/67=20.305$, $p < 0.001$).

DISCUSSION

When comparing themselves with the apprentice under negative interdependence, subjects operate an asymmetric distribution of resources that asserts their own competence and the complementary incompetence of the low-expertise source. When testing their own hypothesis, these subjects make massive use of confirmation. Social comparison and the desire to secure the superiority of their competence articulates their reasoning and representation of the task around self-validity and invalidity of the source.

Independent comparison brings subjects to doubt their own competence almost as much as they doubt that of the source. The positive correlation in this condition reflects the fact that subjects' (relative) incompetence and that of the source are no longer incompatible, which in turn nourish uncertainty regarding the respective validity of the alternative solutions. These subjects' hypothesis testing is more disconfirmatory, and they generalize this strategy to the numerical item where they have not been given any solution proposed by a source. Such testing rests on a form of reasoning and representation of the task tending to an assessment of the validity and of the limits of validity of possible alternatives.

Such findings support the idea that in tasks where one's aptitudes are at stake,

comparison of one's competence with that of the source is of capital importance. In the presence of a low-expertise source, a conflict between incompetences may arise. Such a conflict is defined by the fact that the low reliability of the source's answers does not affect the validity of one's own answers; in fact this renders them neither more valid, nor more invalid. It is the motivation to solve the problem that engages subjects in the process of validation (Moscovici, 1980) and divergent thinking (Nemeth, 1986), revealed here by the use of disconfirmation. This motivation vanishes when the quest becomes affirming self-superiority rather than solving the problem.

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