European Journal of Social Psychology, Vol. 21, 359–363 (1991)

Short Note

Majority and minority influence in inductive reasoning: A preliminary study

PAOLO LEGRENZI
University of Trieste

FABRIZIO BUTERA and GABRIEL MUGNY
University of Geneva

and

JUAN PEREZ
University of Valencia

Abstract

Ninety-three students were exposed to majority and minority influence in an inductive reasoning task. The former induced convergent thinking processes, though its effects were not reducible to mere compliance. The latter activated more divergent constructive processes, supporting the predictions of Conversion Theory.

INTRODUCTION

In line with Conversion Theory (Moscovici, 1980), Nemeth (1986) argued that majority and minority sources of influence differ in their effects on cognitive process. The former induces convergent thought, as targets of influence use the majority position as the unique anchor point. In contrast, minorities induce divergent thinking by opening up the cognitive field and leading targets to consider a wider range of possible responses. Thus Nemeth and her colleagues (Nemeth, Mayseless, Sherman and Brown, 1990) showed that while subjects would conform to a majority position, a minority could encourage a greater orginality and complexity of response strategy.

The present study was conceived to explore the generalizability of these socio-cognitive effects to another context, namely the intellectual processes involved in hypothesis testing (*cf.* Gorman and Carlson, 1989, pp. 102–103). For this purpose Wason's (1960) '2-4-6' task was chosen because despite the diagnostic value of a disconfirmatory strategy for hypothesis testing, the dominant strategy it elicits is confirmatory (Legrenzi, 1983; MacDonald, 1990). Our hypothesis was that attempts to counteract the dominant strategy, if attributable to a majority source, would

This study is part of a research project sponsored by the Fonds National Suisse de la Recherche Scientifique

0046–2772/91/040359–05$05.00

Received 24 August 1990
Accepted 30 November 1990

induce convergent processes, but if attributable to a minority source would induce divergent processes.

METHOD

Subjects and procedure

Ninety-three art students, 30 males, 63 females, median age 21, volunteered for the experiment. They were first shown three problems, the order being counterbalanced across subjects. Each problem consisted in discovering the rule underlying a string of three ascending numbers. The strings were 2-4-6, 3-11-23 and 7-20-89. It was explained to subjects that they could suggest other three-number strings in order to test whether they were compatible or not with the underlying rule. Subjects were also told that as the exercise was to be carried out in writing individual feedback on their suggestions would not be given. However, they were informed of the hypotheses of people allegedly questioned previously (influence source). For each problem, they were shown a second string of numbers attributed to people previously questioned as the string those people had generated to test their hypothesis about the nature of the underlying rule. To create consistency the hypothesis attributed to the influence source was the same for all three problems: 'each new number is greater than the previous one'.

For each of the three problems, subjects were asked to indicate (1) their guess as to the rule underlying the number string presented, (2) a second string of three numbers to test their hypothesis. Following this experimental phase a post-test was presented consisting of two problems. Again order was counterbalanced, but no information was given about the views of the source. In each case two strings compatible with a single rule (2-4-6 and 8-10-12 for one problem, 3-5-7 and 8-31-78 for the other) were presented and subjects had to guess the underlying rule.

Experimental design

The independent variables, in a 2 × 2 design were (a) the nature of the source, majority or minority, and (b) the hypothesis testing strategy of the source, confirmatory or disconfirmatory. To manipulate the nature of the source, the rule and further number string to test the rule were either attributed to 'the large majority of people questioned so far' (specifically 81, 82 and 83 per cent from first to third item), or to a small minority (11, 12 and 13 per cent). To manipulate the source's strategy, the strings of numbers attributed to the source to test the source's hypothesis were either, for the confirmatory strategy, 8-10-12 (for the string 2-4-6), 5-13-35 (for 3-11-23) and 9-30-74 (for 7-20-89) or, for the disconfirmatory strategy, respectively 12-10-8, 35-13-5 and 74-30-9.

Dependent variables

For each problem, those in the experimental phase and those in the post-test, subjects' responses were classified into three categories: (1) *Adoption*, if the content of the rule proposed was the same as that attributed to the source (yielding to the source).

Table 1. Numbers of subjects giving categories of response at least once over the three influence phase items (A) and the two post-test items (B)

Strategy of source: Identity of source		Confirmatory Majority	Confirmatory Minority	Disconfirmatory Majority	Disconfirmatory Minority
Adoption	A	10	7	8	11
	B	12	11	12	14
Reformulation	A	22	14	18	13
	B	15	14	15	15
Innovation	A	11	15	15	11
	B	4	10	5	3
($N =$)		(24)	(24)	(23)	(22)
Disconfirmation strategy	A	3	9	10	7
($N =$)		(24)	(23)	(23)	(22)
	B	0	4	5	6
($N =$)		(21)	(21)	(20)	(20)

(2) *Reformulation*, if the proposed rule was essentially the same but with some additional conditions; most often these involved setting limits on the generality of the rule (cognitive activity anchored on the source's response). (3) *Innovation*, if a quite different rule was proposed (divergent thinking). Subjects' own hypothesis-testing strategies, as revealed in the number strings they suggested themselves, were classified as confirmatory when consistent with the hypothesized rule and disconfirmatory when inconsistent.

RESULTS

If majorities induce convergent thought while minorities induce divergent thought, then we should anticipate a two-fold effect. First, a rule proposed by a majority should more often serve as a reference than one proposed by a minority. The minority should induce more new rules. Second, rules proposed by subjects should more often be tested according to the strategy explicitly demonstrated by the source when that source is a majority.

Nature of the rule

For each response category we distinguished between subjects who used that category at least once from those who never used it. The rule proposed by the source was adopted on at least one of the problems by 38.7 per cent of subjects overall; there were no differences between experimental conditions. However, the experimental manipulations did influence the frequency of *reformulation*, but only in response to problems presented in the experimental phase (see Table 1); the proportion of subjects making this response at least once was significantly higher when the source was a majority than when it was a minority ($X = 6.793$ $p < 0.01$). In contrast, experimental manipulations had no effect on rule innovation in the experimental phase. However, there was an interactive effect of source and strategy on rule innovation in the post-experimental phase. A confirmatory minority produced this response more frequently than a disconfirmatory minority (Fisher's test, $p < 0.03$)

and marginally more frequently than a confirmatory majority (Fisher's test, $p < 0.06$).

Hypothesis testing strategies

The overall proportion of confirmatory strategies, 86.14 per cent, indicates that this remains the dominant strategy; 65.59 per cent of subjects used this strategy exclusively. However, there was an interactive effect of source and strategy here (see Table 1). Confirmatory majorities produced less disconfirmatory strategies on the part of subjects in the experimental phase than the other conditions (Fisher's test, $p < 0.04$). The effects on responses in the post-experimental phase are similar. Here the confirmatory majority produces less frequent disconfirmatory strategies than the disconfirmatory majority (Fisher's test, $p < 0.03$) and also marginally less than the confirmatory minority (Fisher's test, $p < 0.06$).

DISCUSSION

In line with the many previous studies using Wason's task (McDonald, 1990), our results reveal the strength of the confirmation bias in hypothesis testing. Nevertheless, these results also indicate that social influence can modify this dominant response, and can do so in two distinct ways. One of these is a straight-forward effect of majority influence. Here the majority appears to induce convergent thinking (Nemeth, 1986) as witnessed by the fact that the rules subjects proposed were frequently identical to those proposed by the majority source. However, these effects do not seem to be mere compliance given that they persist into the post-experimental phase. When the source's strategy is one of disconfirmation there is no differential effect of the nature of the source, suggesting that subjects focused on the strategy rather than the source's identity. However, a minority source does seem to induce a different kind of influence. This was apparent when a confirmatory strategy was associated with a minority source. This combination produced an appreciable proportion of disconfirmatory strategies, a differentiating effect reminiscent of the dissimilation effect described by Lemaine (1975). We suggest that this reflects an influence on socio-cognitive functioning similar to that discussed by Nemeth (1986); that is, it produces divergent thinking and creativity. This is further supported by the finding that subjects exposed to a confirmatory minority were those most likely to produce new rules in the post-test phase. This preliminary study thus supports the constructivist character of minority influence (*cf.* Mugny and Pérez, 1991) with respect to higher intellectual processes such as hypothesis testing.

REFERENCES

Gorman, M. and Carlson, B. (1989). 'Can experiments be used to study science?' *Social Epistemology*, 3: 89–106.

Legrenzi, P. (1983). 'Il ragionamento', *Giornale Italiano di Psicologia*, 10: 251–267.

Lemaine, G. (1975). 'Dissimilation and different assimilation in social influence (situations of normalization)', *European Journal of Social Psychology*, 5: 93–120.

McDonald, J. (1990). 'Some situational determinants of hypothesis testing strategies', *Journal of Experimental Social Psychology*, 26: 255–274.

Moscovici, S. (1980) 'Toward a theory of conversion behavior'. In: Berkowitz, L. (Ed.) *Advances in Experimental Social Psychology*, Vol. 13, Academic Press, New York.

Mugny, G. and Pérez, J. A. (1991). *The Social Psychology of Minority Influence*, Cambridge University Press, Cambridge.

Nemeth, C. (1986). 'Differential contributions of majority and minority influence', *Psychological Review*, **93**: 1–10.

Nemeth, C., Mayseless, D., Sherman, J. and Brown, Y. (1990). 'Exposure to dissent and recall of information', *Journal of Personality and Social Psychology*, 58: 429–437.

Wason, P. C. 91960). 'On the failure to eliminate hypotheses in a conceptual task', *Quarterly Journal of Experimental Psychology*, **12**: 255–274.