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Numerical support, information processing and attitude change

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Abstract

In two experiments we studied the prediction that majority support induces stronger convergent processing than minority support for a persuasive message, the more so when recipients are explicitly forced to pay attention to the source's point of view; this in turn affects the amount of attitude change on related issues. Convergent processing is the systematic elaboration on the sources position, but with a stronger focus on verification and justification rather than falsification. In Experiment 1 it was found that numerical support is related to information processing as predicted. The greater the support, the more convergent the processing. Experiment 2 replicated this result, and furthermore confirmed our expectations regarding attitude change: The more convergent processing occurs, the less subjects change their attitude on related issues.

INTRODUCTION

Since Asch's (1956) classic experiments on conformity, social psychologists are convinced of the potency of pressures of the social environment on the individual especially if exerted by majorities. The present research tested the idea that numerical support affects the nature of systematic processing, which in turn influences the nature and amount of attitude change. By doing so, we integrate research on majority-minority influence with postulates derived from the information processing approach

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as developed by Chaiken (1987) and Petty and Cacioppo (1986). According to this approach attitude change depends on the systematic or the heuristic processing of persuasive messages. *Heuristic or nonsystematic processing* is the rather automatic and subconscious process in which the validity of a message is primarily decided upon on the basis of external characteristics like credibility or attractiveness of the source, or like appearances of the content. *Systematic processing*, by contrast, is the cognitive scrutinization of all relevant and available information including the message's content in order to decide upon its validity. Compared to heuristic processing, it is characterized by more extensive cognitive elaboration, leading to the generation of more novel arguments. As will be further developed below, this cognitive elaboration may be focused on the message content itself, on related issues, and on more abstract underlying organizing principles. Attitude change following systematic processing generalizes more to related issues, is relatively resistant to counter-argumentation, and is more predictive of behaviour. Whether heuristic or systematic processing will occur depends on the cognitive and situational abilities of recipients and upon their motivation.

It has been suggested that greater numerical support enhances the motivation to process messages systematically (Mackie, 1987; Chaiken and Stangor, 1986). The argument is that individuals expect their own beliefs and attitudes to be widely shared (e.g. Ross, Greene and House, 1977). A violation of this expectation induces systematic cognitive activity (cf. Hastie, 1984). Greater numerical support for a discrepant message will lead to a more severe violation, and therefore to a higher motivation to engage in systematic processing. Given that the arguments are correct and valid, the greater cognitive activity caused by majority support will lead to stronger attitude change on the focal issue, but also to more generalization to related issues compared to messages supported by a minority.

There seems to be firm empirical support for this 'objective consensus approach' as far as attitude change on focal issues is concerned (Latané and Wolf, 1981; Maass, West and Cialdini, 1987; Moscovici, 1980; Tanford and Penrod, 1984). Of course, these results might alternatively be due to the fact that recipients simply rely on a 'consensus implies correctness' heuristic (for a discussion of this heuristic see Axsom, Yates and Chaiken, 1987; Chaiken and Stangor, 1986; Kruglanski and Mackie, 1990).

Mackie (1987) studied the predictions of the 'objective consensus approach' in the realm of attitude change on related issues. In two experiments subjects were simultaneously confronted with arguments supported by a majority and (opposing) arguments with minority support. It appeared that majority supported arguments induced more cognitive elaboration (as exemplified by better argument recall and the generation of more novel arguments supporting the majority position, stronger attitude change and more generalization to a related issue). A potential problem with these experiments, however, is the simultaneous exposure to majority and minority arguments, permitting an alternative explanation in terms of reactance to the minority position (cf. Chaiken and Stangor, 1986; Maass and Clark, 1986). In a third experiment, Mackie (1987) accounted for this critique by exposing subjects either to majority or to minority arguments. Again, majority-supported arguments induced more cognitive elaboration and subsequent attitude change. This effect was, however, particularly strong for change on the focal issue; numerical support only had a weak impact on attitude change on related issues.

The 'objective consensus approach' thus appears to receive good support. Nevertheless, amendment seems required in order to account for some of the findings of studies about minority influence, i.e. a greater spread of attitude change to related issues. Research repeatedly showed that minority-supported arguments induce attitude change on related issues. This result is especially obtained when argumentation is consistent rather than inconsistent over time, congruent rather than incongruent, rigid rather than flexible (Moscovici, 1980; Mugny, 1982), when explicit denial of the arguments' validity is present rather than absent (Moscovici, 1987; Moscovici, Mugny and Perez, 1986; Mugny, 1984, 1985), or when the arguments induce a severe intergroup or normative conflict (Perez and Mugny, 1987; Mugny and Perez, 1991; Moscovici, 1980). Because attitude change on related issues should, according to the information processing approach, be the result of systematic processing, these studies suggest that arguments supported by a minority are sometimes systematically processed, especially when the recipients cannot neglect the minority's point of view any longer. Probably, it is just under those conditions that recipients discover some validity in the minority's point of view, which breaks down their 'consensus implies correctness' assumption.

In sum, both majority and minority support seem to elicit a certain amount of systematic processing, but the latter especially when recipients cannot neglect the minority's position any longer. Moreover, the above discussion showed that the systematic elaboration of majority-supported arguments seems to enhance attitude change especially on focal issues, whereas systematic processing of minority-supported arguments primarily affects change on related issues. It thus appears that the focus of this processing activity is different in the case of majority support, than in the case of minority support. Nemeth and collaborators (Nemeth, 1986; Nemeth and Kwan, 1985, 1987; Nemeth, Mayseless, Sherman and Brown, 1990) indeed showed that majority support stimulates 'convergent' cognitive activity in that the recipient's thoughts are centred on verification and justification of the majority position and more closely follow the way of thinking used by the majority. Minority support on the other hand induces more 'divergent' processing, in that cognitive activity is more centered upon both falsification and improved understanding of the minority position, and disperses among different issues and positions.

Integrating the research on numerical support and attitude change by Mackie (1987) and Moscovici (1980) and Mugny (1982; Mugny and Perez, 1991) with that on numerical support and cognitive activity by Nemeth (1986) then suggests the following extension of the 'objective consensus approach'. Majority support induces convergent processing which inhibits the discovery and consideration of underlying constructs and related issues. Consequently, attitude change on the focal issue is stimulated, but generalization to related issues is inhibited. Minority support, however, elicits divergent processing activity which means that considerable attention will be given to alternative points of view and their underlying organizing principles. Consequently, attitude change on related issues will increase. Especially in the case of minority support, these processes will be stronger the more recipients are forced to consider the source's position seriously.

We tested these amendments to the 'objective consensus approach' in two experiments. Experiment 1 tested our predictions regarding the nature of systematic processing. Experiment 2 tested our predictions regarding the nature of systematic processing as well as its implications for attitude change on focal and related issues.

In both experiments, we used an 'evaluation mode' manipulation to motivate subjects to elaborate on the source's point of view. Following the work of Mummendey and Schreiber (1984; see also Mugny, Sanchez-Mazas, Perez and Roux, 1991) on judgements of in- and outgroups, we distinguish between comparative and noncomparative evaluation. Comparative evaluation means that the recipients of persuasive arguments judge their own and the source's position in terms of which one is better, more valid. Recognition of validity of one position automatically implies the incorrectness of the other position. The recipient is compelled to pay attention to, and to systematically scrutinize the source's point of view. In the case of majority support, this comparative evaluation will stimulate convergent processing and thus foster attitude change on the focal issue but decrease attitude change on related issues. In the case of minority support, by contrast, this procedure enhances the likelihood that recipients must admit that there is some validity in the source's position; this promotes divergent thinking, and may foster attitude change on related issues.

This, however, is not true for noncomparative evaluation, in which the recipient evaluates each attitude position as such, without an explicit comparison with the opposing points of view. Noncomparative evaluation permits the conclusion that opposing positions are 'equally valid, but different' (*cf.* Mummendey and Schreiber, 1984; Tetlock, 1986). Moreover, in a noncomparative evaluation mode, the recipient can evade systematic processing, for example in case of minority support for the discrepant attitude position. Because recipients in the noncomparative evaluation mode are free to either consider or ignore the source's position (as was the case in the discussed past research), one would expect replication of past findings especially in this noncomparative evaluation mode condition.

EXPERIMENT 1

The nature of systematic processing as a function of numerical support and evaluation mode concerned the research theme of the first experiment. The hypothesis was that comparative evaluation promotes convergent processing in case of majority support, but decreases convergent processing in case of minority support.

Method

Design

The design was a 2×2 factorial, involving Numerical Support (majority versus minority), and Evaluation Mode (noncomparative versus comparative) as independent variables. Own Attitude was added as a factor to control for effects of discrepancy between the subjects' own position and the one advocated by the source. The main dependent variable, convergent processing, was assessed by employing a thought listing technique.

Subjects

One-hundred and eight students from a college in Geneva, Switzerland, 67 female and 41 male, aged between 14 and 19, participated in the experiment which was

conducted in classrooms during regular school hours. Subjects were randomly assigned to experimental conditions.

Procedure and independent variables

The experimenter introduced the study by telling subjects that they were about to participate in a large survey concerning all kinds of issues of interest to young students. Subjects were subsequently asked to fill out a questionnaire. The experimenter emphasized the confidential and anonymous character of the survey, and asked the subjects to work individually.

The first page of the questionnaire informed subjects that the researchers were interested in 'your opinion about whether or not to increase the number of foreigners allowed to settle in Switzerland' (at that time the number of foreigners totalled about 15 per cent of the Swiss population). On the second page, subjects were asked to indicate their agreement or nonagreement with four attitude statements about allowing a larger number of foreigners to settle down in Switzerland. All opinions were to be expressed on 100-point Likert scales (1 = completely disagree, to 100 = completely agree). This attitude questionnaire had good internal reliability (Cronbach's $\alpha = 0.78$). On the third page of the questionnaire, the manipulation of numerical support was induced. All subjects were told that a large number of college students had already been questioned about their attitudes. Subjects in the *majority support condition* further read that a large majority of 82 per cent was positive about the idea of allowing more foreigners to settle in Switzerland. Subsequently, they learned that they were about to read seven arguments, 'most frequently forwarded by this majority'. Hereafter, subjects read seven arguments strongly pleading for allowing more foreigners to settle in Switzerland. Subjects in the *minority support condition* received exactly the same information, supposedly stemming from a 'small minority of 18 per cent'.

Upon reading the arguments, the evaluation mode was manipulated on the following page. Subjects were told that they had to answer some questions about the arguments they just read. Three arguments were given again. In the *comparative evaluation condition*, for each of the three arguments, subjects had to distribute 100 'points of correctness' between their own attitude position and the position defended in that specific argument of the source. Thus, the more points they gave to the persuasive argument, the less they could give to their own position. In the *noncomparative evaluation condition*, for each of the three arguments, subjects had to attribute x out of 100 points of correctness to their own attitude, and subsequently x out of a new 100 points of correctness to the position defended in the specific argument. Thus, the number of points given to the persuasive argument had no objective influence whatsoever on the number of points subjects could give to their own opinion. Contrary to the comparative evaluation, the subjects in the noncomparative evaluation condition thus were able to attribute points to the source without consequences for their own position, leaving them with all the freedom to neglect the source's position as much as they would.

As already noted, subjects' own attitude position may play an important role: Whether one initially opposes or agrees with the arguments presented may have a considerable influence on the need to consider the source's position before distribut-

ing points. Therefore, subjects' *own attitude* was added to the design as an independent variable.

After the subjects had completed the evaluation task, they answered a manipulation check for the induction of numerical support, gave associations with the word 'foreigner', were debriefed and dismissed.

Dependent variables

To measure nature of processing as a function of numerical support and evaluation mode, subjects were, at the end of the questionnaire, asked to write down some associations with the word 'foreigner.' They were given 12 lines to do so, although it was emphasized that they were not obliged to give precisely 12 associations. The originality of associations indicates the degree of convergent versus divergent cognitive activity: The more novel associations subjects give, the more divergent their cognitive activity has been (cf. Nemeth and Kwan, 1985; Nemeth, 1986).

Results

On average, subjects had slightly favourable attitudes towards allowing more foreigners to settle in Switzerland ($M = 54.1$, median = 53.7 with 100 = completely agree). To account for possible effects of the discrepancy of the message with the attitude of subjects, the variable *own attitude* (unfavourable versus favourable) was created by assigning those subjects with an attitude score equal or below the midpoint of the scale (i.e. 50) to the 'unfavourable' category ($N = 41$). The remaining subjects were assigned to the 'favourable' category ($N = 67$). Data were analysed using a $2 \times 2 \times 2$ design, involving numerical support, evaluation mode and *own attitude*. The number of subjects per cell in this design ranged from 11 to 23.

Manipulation checks

The adequacy of the numerical support manipulation was checked by asking subjects what percentage of students they believed supported the positions defended in the arguments presented. The expected main effect for numerical support was significant, showing that subjects in the majority support condition believed this percentage to be higher than subjects in the minority support condition, $M = 72.9$ per cent versus $M = 23.6$ per cent; $F(1,100) = 41.2$, $p < 0.001$.

The adequacy of the evaluation mode manipulation was checked by analysing the correlations between the number of points allocated to one's own viewpoint, and those allocated to the sources viewpoint. This correlation should be perfectly negative in the comparative evaluation conditions, but should be around zero in the noncomparative evaluation conditions. This proved to be the case, $r = -1.0$, and $0.04 < r < 0.06$, respectively.

Information processing

Analysis of variance on the number of associations with the word 'foreigner' yielded no effects whatsoever, all $F(1,100) < 1$; overall $M = 10.3$. Probably, it was easy to generate associations. It means, however, that we were unable to test the 'objective

consensus approach' hypothesis that the *degree* of systematic processing is higher in case of majority, rather than minority support.

To test the prediction that numerical support and evaluation mode affect convergent cognitive activity, we analysed the number of novel associations generated. Associations were considered as 'novel' when they were only given by one, and only one subject. Two judges, blind to hypotheses or experimental conditions counted the number of 'novel' associations (their interrater agreement was 0.91). Analysis of Variance on the number of novel associations revealed a significant interaction between own attitude and evaluation mode, $F(1,100) = 4.63$, $p < 0.05$, showing that under comparative evaluation, subjects with unfavourable attitudes generated less novel associations than subjects with favourable attitudes ($M = 1.63$ versus $M = 3.13$, $p < 0.05$), while no significant differences emerged under noncomparative evaluation ($M = 1.76$ versus $M = 2.92$, n.s.).

Consistent with prior research (e.g. Nemeth and Kwan, 1985), a main effect for numerical support emerged, showing that subjects generated more novel associations in case of minority support, than in case of majority support, $M = 3.04$ versus $M = 1.72$, $F(1,100) = 11.06$, $p < 0.001$. As predicted, this effect was qualified by a significant interaction between numerical support and evaluation mode, $F(1,100) = 3.9$, $p < 0.05$. As can be seen in Figure 1, majority support produces more convergent processing (i.e. less novel associations) under comparative than noncomparative evaluation, while minority support produces somewhat less convergent processing (i.e. more novel associations) under comparative than noncomparative evaluation.

Figure 1. Number of novel associations generated as a function of numerical support and evaluation mode

Discussion

Experiment 1 supported the predictions regarding the nature of cognitive elaboration as a function of numerical support and evaluation mode. Compared to noncomparative evaluation, comparative evaluation stimulates convergent processing of arguments supported by a majority, and decreases convergent thinking in case of minority support. In the Introduction, we argued that convergent processing is positively associated with attitude change on the focal issue, but inversely related to attitude change on related issues. This prediction was tested in Experiment 2.

EXPERIMENT 2

The data of Experiment 1 did not permit a test of the 'objective consensus approach' prediction that numerical support affects the amount of systematic processing. Experiment 2 extends the design to accomplish just that. One way to assess the amount of systematic processing of persuasive arguments is to vary the quality of the persuasive arguments. When people process arguments nonsystematically, argument quality should have little or no effect on attitude change, because recipients focus on source characteristics rather than the arguments' content. When, however, arguments are systematically processed, argument quality should affect attitude change, with strong arguments producing more change than weak arguments (Petty and Cacioppo, 1986). By adding the strength of arguments as a factor in the design we can more confidently draw conclusions about both the nature and the amount of information processing than when using thought listings alone.

As mentioned earlier, Experiment 2 furthermore attempts to extend the findings of Experiment 1 to the field of attitude change on focal and related issues. Concerning the focal issue, it was predicted that attitude change on focal issues will be stronger in case of majority than minority support, whether the comparative or noncomparative evaluation mode is used; this would be, however, especially true in the case of strong arguments. Concerning attitude change on related issues, we predicted that relative to noncomparative evaluation, comparative evaluation decreases change in the case of majority support, and increases change in the case of minority support.

Method

Design

The design was a $2 \times 2 \times 2$ factorial involving numerical support (majority versus minority), evaluation mode (comparative versus noncomparative), and argument quality (strong versus weak). Own attitude was added to the design in order to control for subjects' initial positions. The dependent variables were attitude change on both the focal and on related issues, and processing mode as assessed by a thought listing technique.

Subjects

One-hundred and eleven students from a college in Groningen, 46 male and 65 female, all aged between 14 and 18, participated in the experiment, for which they

received 10 Dutch Guilders (about 5 US dollars). Subjects came to the laboratory in groups of eight and were randomly assigned to experimental conditions.

Overview of the procedure

Upon arrival in the laboratory, subjects were seated in separate cubicles in front of personal computer. All instructions, experimental information and questions appeared on the video screen. Answers could be given by using the keyboard. After some instructions concerning computer use, the experiment began by providing subjects with a general introduction. The remaining procedure and information provided matched the procedures employed in the first experiment as closely as possible. However, we changed the attitude issue and the sets of persuasive arguments. Subjects were asked to give their opinion about three statements concerning the introduction of admission exams for university (focal issue), and about one statement regarding the relation between students' academic achievement and the grant provided to them by the government (related issue) (all nine-point Likert-type scales with 9 = completely agree). The question about the related issue was embedded in six filler items about issues that had nothing to do with higher education.

Upon finishing the attitude pretest, numerical support was manipulated (see below), and subjects were presented with four (strong or weak) arguments (see also below). The arguments were first presented one by one, and later all four together. After presentation of the arguments, the evaluation mode was manipulated (see below). Subsequently, subjects completed the attitude questionnaire once again, responded to a thought listing task and some manipulation checks (see under 'Dependent variables'), were debriefed and dismissed.

Independent variables

Manipulation of argument quality A set of four 'strong', and a set of four 'weak' arguments were constructed, and subsequently pretested with 51 students from the same population as the experimental subjects. These pilot-subjects filled out a short questionnaire during regular school hours. After indicating their attitude towards admission exams (1 = completely against; 9 = completely agree), they read either the four 'strong' or the four 'weak' arguments (see Table 1) and answered some questions about these arguments (all nine-point Likert scales).

The mean attitude towards admission exams was perfectly neutral, in that both the mean and the median matched the scale-midpoint (i.e. 5.0 where 9 = completely agree). Ratings on the three questions concerning argument evaluation were analysed by means of a 2×2 (own attitude by argument quality) multivariate analysis of variance, which yielded only a significant multivariate effect for argument quality, $F(3,45) = 8.3$, $p < 0.001$. Compared to the set of strong arguments, the set of weak arguments was rated as less convincing, $M = 5.7$ versus $M = 3.4$; $F(1,47) = 16.1$, $p < 0.0001$, as of lower quality, $M = 6.4$ versus $M = 3.9$; $F(1,47) = 24.7$, $p < 0.0001$, and as less correct, $M = 5.6$ versus $M = 3.7$; $F(1,47) = 12.6$, $p < 0.001$. The strong and weak set of arguments did not differ, however, in the extent to which they were in favour of admission exams, $M = 8.13$ versus $M = 7.81$; $F(1,47) < 1$, n.s.

Numerical support As in Experiment 1, subjects were told that a large number of college students had already been questioned about their attitudes. Subjects in

Table 1. Sets of strong and weak arguments used to manipulate argument quality

Strong arguments: Admission exams should be introduced because:

1. People who succeed have better chances to finish their academic education successfully
2. People who are expected to fail can better be diverted immediately to an appropriate school*
3. Academic education is very expensive and therefore careful selection of high quality students is needed
4. Admission exams provide a better test of the specific skills and abilities needed for higher education than school exams*

Weak arguments: Admission exams should be introduced because:

1. You can use the summer vacation to further prepare
 2. You have to make exams during academic education anyway*
 3. School exams can best be abolished
 4. The correction of these exams hardly takes extra time or money*
-

Arguments are translated from Dutch. Subjects were provided with either the strong or the weak set. Arguments marked with an asterisk were used in the evaluation mode manipulation

the majority-support condition further read that a large majority of 82 per cent favoured the introduction of admission exams. Subjects in the minority-support condition were presented with exactly the same information, with always 'large majority of 82 per cent' replaced by 'small minority of 18 per cent'.

Evaluation mode This variable was manipulated as in Experiment 1, just after subjects had taken notice of the persuasive arguments.

Dependent variables

The measurement of attitude change has already been described above. After the attitude posttest, subjects were asked to write down new arguments that they felt were of relevance too. Subjects had the possibility of generating a maximum of five new arguments, but it was emphasized that they were not obliged to give this maximum.

Results

As in the pilot study, the average pretest attitude on the focal issue was almost neutral (overall mean = 5.04, median = 5.0 with 9 = completely agree). The variable own attitude (unfavourable versus favourable) was created by assigning those subjects with pretest attitude scores equal or below the midpoint of the scale (5.0) to the unfavourable category ($N = 60$; $M = 3.77$) and the others to the 'favourable' category ($N = 51$; $M = 6.45$). As a result of this procedure, the number of subjects per condition ranged from 5 to 9.

Manipulation checks

The adequacy of the numerical support manipulation was checked by asking subjects what percentage of students they believed would support the introduction of admission exams. Only the main effect for numerical support was significant, showing that subjects in the majority support condition believed this percentage to be higher

than those in the minority condition, $M = 62$ per cent versus $M = 26$ per cent; $F(1,95) = 89.3, p < 0.001$.

The adequacy of the evaluation mode manipulation was checked by analysing the correlations between points of correctness allocated to one's own, and to the source's attitude position. As in Experiment 1, the correlations were perfectly negative under comparative evaluation, and close to zero under noncomparative evaluation ($0.03 < r < 0.06$ for all cells). Because the ratings for the two separate arguments were highly correlated: $r(111) = 0.78, p < 0.001$, they were summed. We analysed the average difference in points of correctness given to one's own opinion minus the number of points given to the source's position (points allocated in the noncomparative evaluation conditions were divided by 2, in order to obtain indices comparable with those in the comparative evaluation condition). Analysis of variance yielded main effects for evaluation mode, $F(1,95) = 48.95, p < 0.001$, and for argument quality, $F(1,95) = 50.62, p < 0.001$, both qualified by a significant interaction between evaluation mode and argument quality, $F(1,95) = 12.42, p < 0.001$. Inspection of cell means revealed that under noncomparative evaluation, differences in points allocated did not vary as a function of argument quality ($M_{\text{strong}} = 7.20$ versus $M_{\text{weak}} = 12.80$, n.s.) while under comparative evaluation subjects strongly favoured their own attitude position when the source had weak arguments, and slightly favoured the source when strong arguments had been presented ($M_{\text{strong}} = -7.89$ versus $M_{\text{weak}} = 34.10, p < 0.001$). These data thus support the proposition that the evaluation mode influences the attention paid to the source's point of view. Also they illustrate the adequacy of the argument quality manipulation.

Attitude change

The ratings on the three questions measuring attitudes on the focal issue were reasonably correlated (Cronbach's $\alpha = 0.63$ on pretest scores) and were added into one index. On the pretest, there was a slightly positive correlation between attitudes on the focal and the related issue, $r(111) = 0.21, p < 0.05$. Attitude change between the pretest and posttest was analysed in two ways, namely by using an analysis of variance on the posttest attitudes with the pretest attitudes as a covariate, and by means of an analysis of variance on gain scores (posttest minus pretest). Both analyses gave virtually identical results. Because the gain score analysis is more easily interpreted (i.e. it is immediately clear whether subjects' attitudes change towards, or away from the source's position), this analysis is reported here.

Attitude change on the focal issue The cell means for attitude change on the focal issue as a function of numerical support, argument quality and evaluation mode are presented in Table 2. Analysis of variance revealed four main effects: For own attitude, showing that subjects with unfavourable attitudes changed more ($M = 0.41$) than those with favourable attitudes, ($M = -0.41$), $F(1,95) = 10.9, p < 0.001$; for numerical support, showing that majority support produced more attitude change than minority support, $F(1,95) = 8.1, p < 0.005$; for argument quality, showing that strong arguments produced more attitude change than weak arguments, $F(1,95) = 4.85, p < 0.05$; and, finally, for evaluation mode, indicating that subjects changed more under noncomparative than comparative evaluation, $F(1,95) = 5.2, p < 0.025$. Except for the effects of own attitude, all other effects were qualified by a three-way interaction between numerical support, argument quality and evalu-

ation mode, $F(1,95) = 14.6, p < 0.001$. The effects of numerical support on attitude change were highly contingent on the evaluation mode. In the case of noncomparative evaluation, attitude change clearly differed as a function of argument quality in the case of majority support, but not in the case of minority support. Therefore, it may be concluded that majority support led to systematic processing and minority support led to nonsystematic processing under noncomparative evaluation. Comparative evaluation stimulated systematic processing of minority-supported arguments (stronger attitude change away from the minority's position occurred in case of weak rather than strong arguments). Somewhat less expected, however, is the observation that no change whatsoever occurred in the case of majority support. In the Discussion we will further elaborate on this result.

Table 2. Attitude change on the focal issue as a function of evaluation mode, numerical support, and argument quality

Quality	Evaluation mode			
	Comparative		Noncomparative	
	Majority	Minority	Majority	Minority
Strong	-0.29 _{ab}	0.23 _a	1.67 _c	-0.49 _{ab}
Weak	0.25 _a	-1.15 _b	0.01 _{ab}	.02 _{ab}

A positive sign indicates a change towards the advocated position. Means with unequal subscripts differ at $p < 0.05$.

Attitude change on the related issue Analysis of variance on attitude change on the related issue revealed no main effects, but an interaction between numerical support and evaluation mode, $F(1,95) = 6.1, p < 0.025$, as was predicted. This effect is illustrated in Figure 2. Compared to noncomparative evaluation, comparative evaluation inhibited attitude change on related issues in the case of majority support ($M = -0.34$ versus $M = 0.65, p < 0.05$), but promoted attitude change in the case of minority support ($M = 0.23$ versus $M = -0.57, p < 0.10$). A borderline significant three-way interaction between numerical support, evaluation mode and argument quality, $F(1,95) = 4.5, p < 0.06$, additionally showed that the pattern described above was especially strong in the case of weak, rather than strong arguments (see also Table 3).

Information processing

Two judges, blind to experimental conditions and hypotheses, scored (1) the number of new arguments in favour of admission exams (i.e. the source's position), and (2) the number of new arguments against admission exams. The Cohen's Kappas for interrater agreements exceeded, for both indices, the value of 0.74. Differences between judges were discussed and a common decision was reached. The amount of convergent cognitive activity is expressed in the ratio of the number of pro-arguments, divided by the number of counter-arguments. The higher the score, the more convergent cognitive activity was (cf. Mackie, 1987; Nemeth, 1986). These scores were entered in an analysis of variance. As in Experiment 1, a main effect for numerical support shows that majority support elicited more convergent processing than minority support, $M = 0.54$ versus $M = 0.26, F(1,95) = 3.78, p < 0.055$. This effect was

Figure 2. Attitude change on related issues as a function of numerical support and evaluation mode

Table 3. Attitude change on the related issue as a function of evaluation mode, numerical support, and argument quality

Quality	Evaluation mode			
	Comparative Majority	Comparative Minority	Noncomparative Majority	Noncomparative Minority
Strong	-0.07 _b	0.08 _b	0.21 _b	-0.20 _{bc}
Weak	-0.67 _{bc}	0.38 _{ab}	1.07 _a	-0.93 _c

A positive sign indicates a change towards the advocated position. Means with unequal subscripts differ at $p < 0.05$.

qualified by a significant three-way interaction between numerical support, argument quality and evaluation mode, $F(1,95) = 5.41$, $p < 0.025$. Cell means are shown in Table 4: Compared to noncomparative evaluation, comparative evaluation promoted convergent processing of majority arguments, and inhibited convergent processing of minority arguments, albeit only in case of weak arguments. Especially when weak arguments were given, these data are strongly compatible with the pattern observed in Experiment 1, and support the prediction once again.

We predicted that convergent processing focuses on the focal attitude issue, thereby inhibiting attitude change on related issues. This idea received further support by the significant positive correlation between convergent processing and attitude change on the focal issue, $r(111) = 0.20$, $p < 0.025$, and a significant negative correlation

Table 4. Convergent processing as a function of evaluation mode, numerical support, and argument quality

Quality	Evaluation mode			
	Comparative Majority	Comparative Minority	Noncomparative Majority	Noncomparative Minority
Strong	0.14 _{a→b}	0.08 _b	0.93 _a	0.30 _{ab}
Weak	0.79 _a	0.15 _b	0.33 _{ab}	0.47 _{ab}

A higher mean indicates more convergent processing. Means with unequal subscripts differ at $p < 0.05$.

between convergent processing and attitude change on the related issue, $r(111) = -0.17, p < 0.05$.

CONCLUSIONS AND DISCUSSION

The present research was concerned with the conditions and processes that lead people to change their attitudes under the influence of persuasive arguments with either majority or minority support. In two studies, we tested the prediction that explicit motivation to process majority-supported arguments increases convergent cognitive activity, restricting attitude change on related issues, while systematic processing of minority arguments decreases convergent thinking, promoting attitude change on related issues.

Both experiments support our hypothesis, in that comparative evaluation increases convergent processing which inhibits attitude change on related issues in the case of majority support, and inhibits convergent processing stimulating attitude change on related issues in the case of minority support. Experiment 2 additionally showed that these effects are especially strong when the source's point of view is weakly defended. This suggests that systematic processing inducing attitude change on related issues is a 'constructive' cognitive activity (*cf.* Mugny and Perez, 1991); people detect underlying principles and relations, and generate alternative points of view. Being confronted with a weakly defended position may challenge recipients to adopt such a 'constructive' approach more than being confronted with a strongly defended position. In fact, the need for constructive cognitive activity is smaller in the latter situation since the position already has a firm argumentative base. Our data furthermore indicate that such constructive cognitive activity occurs in the case of majority as well as minority support, albeit under different conditions: Comparative evaluation increases constructive activity in the case of minority support, but decreases it in the case of majority support.

There was a differential impact of evaluation mode for attitude change on the focal issue as well. Comparative evaluation increases systematic processing of minority arguments, which in turn leads to a strong negative change in case of weak arguments. This result suggests that the 'constructive' divergent processing distracts from the focal issue. Alternatively, this result can also be caused by the individual's aversion of being identified with a minority source, especially when this minority presents weak arguments (Mugny, Kaiser, Papastamou and Perez, 1984). Consistent with the 'objective consensus approach' (Mackie, 1987), majority support produces attitude change on a focal issue in the case of strong but not in the case of weak arguments when recipients are not explicitly forced to pay attention to the majority's

point of view (i.e. noncomparative evaluation). Less anticipated, however, was the observation that comparative evaluation caused no change at all in the case of majority support. An explanation can be sought in the nature of the evaluation mode manipulation. Comparative evaluation not only forces recipients to consider the source's position seriously, it also forces recipients to validate their own opinion at the expenditure of the source's position, or, more important, to invalidate their own opinion in order to validate the source's position. In case of minority support, such a compelling procedure seems required to induce nonconvergent systematic processing, although it increases the aversion of identification with the minority source at the same time. In the case of majority support, however, such a demanding procedure might induce some kind of reactance: The recipient's own attitude is already severely questioned by the large numerical support for a deviant position. It might be possible that when this (already compelling) situation is rendered even more conflictual, recipients leave the psychological field (*cf.* Brehm and Brehm, 1981; Lewin, 1947; Maass and Clark, 1986). Further research is needed, however, to confirm these findings and explanations.

Assuming that majority support for persuasive arguments implies a more conflictual and compelling situation than minority support, the following theoretical framework is suggested by our data. It seems that effects of minorities on attitudes and cognitions increase as the minority induces a more cognitively conflictual situation: This then leads to more divergent and constructive thinking, promoting the detection of organizing principles and related concepts. Our data show that this constructive thinking opens the way to attitude change on related rather than focal issues. The effects of majorities on people's attitudes and cognitions seem to be inversely related to the conflictual stance adopted by the majority: As cognitive conflict increases, people's constructive approach to the issue at stake decreases, in the end resulting in mere compliance, and lack of (private) attitude change on focal or related issues.

REFERENCES

- Asch, S. E. (1956). 'Studies of independence and conformity: a minority of one against a unanimous majority', *Psychological Monographs*, 70: (Whole No. 416).
- Axsom, D., Yates, S. and Chaiken, S. (1987). 'Audience response as a heuristic cue in persuasion', *Journal of Personality and Social Psychology*, 53: 30-40.
- Brehm, S. S. and Brehm, J. W. (1981). *Psychological Reactance. A Theory of Freedom and Control*, Academic Press, New York.
- Chaiken, S. (1987). 'The heuristic model of persuasion'. In: Zanna, M. P., Olson, J. M. and Heran, C. P. (Eds) *Social Influence: The Ontario Symposium*, Vol. 5, Erlbaum, Hillsdale, NJ.
- Chaiken, S. and Stangor, C. (1986). 'Attitudes and attitude change', *Annual Review of Psychology*, 38: 575-630.
- Hastie, R. (1984). 'Causes and effects of causal attribution', *Journal of Personality and Social Psychology*, 46: 44-56.
- Kruglanski, A. and Mackie, D. M. (1990). 'Majority and minority influence: A judgmental process analysis', *European Review of Social Psychology*, 1: 229-261.
- Latané, B. and Wolf, S. (1981). 'The social impact of majorities and minorities', *Psychological Review*, 88: 438-453.
- Lewin, K. (1947). 'Group decision and social change'. In: Newcomb, T. M. and Hartley, E. (Eds) *Readings in Social Psychology*, Holt, Rinehart and Winston, New York.
- Maass, A. and Clark, R. III (1986). 'Conversion Theory and simultaneous majority/minority

- influence: Can reactance offer an alternative explanation?' *European Journal of Social Psychology*, 16: 305-309.
- Maass, A., West, S. G. and Cialdini, R. B. (1987). 'Minority influence and conversion'. In: Hendrick, C. (Ed.) *Review of Personality and Social Psychology*, Vol. 8, Sage, Beverly Hills, CA, pp. 55-79.
- Mackie, D. M. (1987). 'Systematic and nonsystematic processing of majority and minority persuasive communications', *Journal of Personality and Social Psychology*, 53: 41-52.
- Moscovici, S. (1980). 'Toward a theory of conversion behavior'. In: Berkowitz, L. (Ed.) *Advances in Experimental Social Psychology*, Vol. 13, Academic Press, New York, pp. 209-239.
- Moscovici, S. (1987). 'Le deni'. In: Moscovici, S. and Mugny, G. (Eds) *Psychologie de la Conversion*, Delval, Cusset, pp. 251-260.
- Moscovici, S., Mugny, G. and Perez, J. A. (1986). 'Les effets pervers du deni (par la majorité) des opinions d'une minorité', *Bulletin de Psychologie*, 38: 803-812.
- Mugny, G. (1982). *The Power of Minorities*, Cambridge University Press.
- Mugny, G. (1984). 'Compliance, conversion and the Asch paradigm', *European Journal of Social Psychology*, 14: 353-368.
- Mugny, G. (1985). 'Direct and indirect influence in the Asch paradigm: effects of "valid" or "denied" information', *European Journal of Social Psychology*, 15: 457-461.
- Mugny, G., Kaiser, C., Papastamou, S. and Perez, J. A. (1984). 'Intergroup relations, identification and social influence', *British Journal of Social Psychology*, 23: 317-322.
- Mugny, G. and Perez, J. A. (1991). *The Social Psychology of Minority Influence*, Cambridge University Press.
- Mugny, G., Sanchez-Mazas, M., Perez, J. A. and Roux, P. (1991). 'Independence and interdependence of group judgments: Xenophobia and minority influence', *European Journal of Social Psychology*, 21: 213-224.
- Mummendey, A. and Schreiber, H. J. (1984). 'Different just means better: Some obvious and hidden pathways to ingroup favoritism', *British Journal of Social Psychology*, 23: 363-368.
- Nemeth, C. (1986). 'Differential contributions of majority and minority influence processes', *Psychological Review*, 93: 10-20.
- Nemeth, C. and Kwan, J. (1985). 'Originality of word associations as a function of majority versus minority influence', *Social Psychology Quarterly*, 48: 277-282.
- Nemeth, C. and Kwan, J. (1987). 'Minority influence, divergent thinking and detection of correct solutions', *Journal of Applied Social Psychology*, 17: 786-797.
- Nemeth, C., Mayseless, O., Sherman, J. and Brown, Y. (1990). 'Exposure to dissent and recall of information', *Journal of Personality and Social Psychology*, 58: 429-437.
- Petty, R. E. and Cacioppo, J. T. (1986). 'The elaboration likelihood model of persuasion'. In: Berkowitz, L. (Ed.) *Advances in Experimental Social Psychology*, Vol. 19, Academic Press, New York, pp. 123-205.
- Perez, J. A. and Mugny, G. (1987). 'Paradoxical effects of categorization in minority influence: When being an outgroup is an advantage', *European Journal of Social Psychology*, 17: 157-169.
- Ross, L., Greene, D. and House, P. (1977). 'The "False consensus effect": An egocentric bias in social perception and attribution processes', *Journal of Experimental Social Psychology*, 13: 279-301.
- Tanford, S. and Penrod, S. (1984). 'Social influence model: A formal integration of research on majority and minority influence processes', *Psychological Bulletin*, 95: 189-225.
- Tetlock, P. E. (1986). 'A value pluralism model of ideological reasoning', *Journal of Personality and Social Psychology*, 50: 819-827.