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Convergent and divergent processing of majority and minority arguments: effects on focal and related attitudes

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Abstract

This research concerned attitude change towards a majority or minority position as a function of convergent and divergent message processing. Results of a 2 (majority/minority support for persuasive arguments) × 3(convergent/divergent/no-processing instructions) experiment showed that recipients identified more with a majority rather than minority, and identification was positively correlated with attitudes on the focal, but not the related issue. More importantly, results showed that in the no-processing condition, counter-attitudinal majority arguments produced more positive attitudes on the focal rather than related issue; minority arguments had no effects on either issue. A similar pattern emerged under convergent processing: majority support produced more positive attitudes on focal than related issues, while minority support had no effect on either issue. Divergent processing instructions, finally, produced more positive attitudes on the related issue than on the focal issue, especially in the case of minority support. Unexpectedly, majority arguments under divergent processing had no effect on focal or related attitudes whatsoever. Overall, results support the conclusion that majority arguments affect attitudes on focal issues more than on related issues because of convergent message processing, while minority arguments affect attitudes on related issues more than on focal issues because of divergent message processing and a desire to avoid identification with the source. Copyright © 1999 John Wiley & Sons, Ltd.

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While thirty years ago a vast majority of the Dutch population held negative attitudes towards abortion, birth control, euthanasia, or homosexuality in the military, most of these issues are currently opposed by a minority only. Within small groups, like juries, we witness similar dynamics: Whereas initially a majority may favor a guilty verdict, members may gradually become convinced that the suspect is innocent.

Attitudes are dynamic and change over time. At both the societal and the small-group level, majorities and minorities influence one another's attitudes. Indeed, a large number of studies showed that individuals often comply with the opinion held by the majority, but sometimes attend to a minority position (for reviews, see De Vries, De Dreu, Gordijn, & Schuurman, 1996; Maass & Clark, 1983; Moscovici, 1985; Wood, Lundgren, Ouelette, Busceme, & Blackstone, 1994). Unclear is what the precise mechanisms are that account for majority and minority influence. This paper seeks to clarify part of this process.

ATTITUDES AS A FUNCTION OF MAJORITY AND MINORITY INFLUENCE

A robust observation is that persuasive arguments from a majority elicit attitude change on the focal issue (the issue directly under debate), while identical arguments attributed to a minority (1) have less effect in general, and (2) influence attitudes on related issues more than attitudes on the focal issue. For example, a majority arguing in favor of abortion (the focal issue) may produce positive attitudes towards abortion, but has little influence on related issues such as birth control and euthanasia. A minority making a case for abortion, in contrast, will have little influence on the abortion issue, but may have some impact on related attitudes regarding birth control and euthanasia (e.g. Aebischer, Hewstone, & Henderson, 1982; Alvaro & Crano, 1997; De Dreu & De Vries, 1993, 1996; Mugny, 1982; Moscovici, 1980; Mugny & Perez, 1991; Wood *et al.*, 1994).[1]

An explanation for these effects may be derived from the *Heuristic-Systematic Model* (Chaiken, 1980, 1987; Eagly & Chaiken, 1993), which distinguishes between heuristic and systematic processing of persuasive messages. In the case of heuristic processing, the validity of a particular attitude position is assessed on the basis of heuristic cues such as argument length, source credibility, or likability of the source. In the case of systematic processing, which requires more effort and cognitive ability, the validity of a particular attitude position is assessed on the basis of content-related

[1]Attitude change on focal issues and attitude change on related issues are instances of 'direct' and 'indirect' influence. Many studies looked at attitudes on focal issues and on related issues (Alvaro & Crano, 1997; De Dreu & De Vries, 1993; Mackie, 1987; Mugny, 1982). Others operationalized direct versus indirect influence in terms of public versus private acceptance of the advocated position (e.g. Maass & Clark, 1984; Trost, Maass, & Kenrick, 1992; for a review see Levine & Russo, 1987). Still others have looked at changes in perceptions in a primary task (direct influence) and a secondary task (indirect influence) (e.g. Martin, 1995; Moscovici & Personnaz, 1980; Mugny, 1985). Different operationalizations of direct versus indirect influence tend to behave differently and produce different results. For example, initial evidence for (in)direct (minority) majority influence in perceptual tasks (Moscovici & Personnaz, 1980) seems not so robust (Doms & Van Avermaet, 1980; Martin, 1995), while (in)direct influence in the domain of attitudes has been found by a variety of researchers in different countries using different topics and paradigms (cf. Wood *et al.*, 1994). To avoid confusion and unwarranted generalization we use the terms focal versus related issues, instead of direct versus indirect influence.

cues, such as the validity of the supporting arguments, their logical coherence, and their internal consistency.

Several authors argued that discrepancy with a majority is surprising, stressful and increases doubt in one's own opinion (Baker & Petty, 1994; De Vries *et al*., 1996; Mackie, 1987; Moscovici, 1980). Put otherwise, a counter-attitudinal majority is likely to motivate people to engage in systematic processing. In addition, majority-induced systematic processing is convergent in nature—recipients focus on the majority position and its arguments to see whether the majority is correct and how the majority position may be justified (Nemeth, 1986, 1995; for empirical evidence, see, e.g. Nemeth & Kwan, 1985, 1987; Mackie, 1987; Peterson & Nemeth, 1995).

Minority influence is less stressful, and may be easily rejected using the heuristic 'a lack of consensus implies a lack of validity'. Thus, minority influence is unlikely to motivate people to engage in systematic information processing by itself (Mackie, 1987). However, other variables may cause systematic processing of the minority message. This may happen, for example, when the minority is consistent over time (cf. Moscovici, 1980), when it advances its arguments in a rigid manner (Mugny, 1982), when the attitude issue is highly involving to the recipients (De Dreu & De Vries, 1996; Trost, Maass, & Kenrick, 1992), or when entity attributions prevail (Bohner, Erb, Reinhard, & Frank, 1996). For example, Wood, Poal, Leck, and Purvis (1996, Experiment 2) confronted participants with a counterattitudinal though somewhat ambiguous minority message. In one condition participants were asked first to write down their interpretation of the minority message and then what their own attitudes were. In another condition, participants were first asked about their own attitudes and then about their interpretation. Wood *et al*. found minority influence only in the first condition, that is, in the condition where participants were motivated to process the minority arguments in order to generate their interpretations. These effects were not replicated for a majority source—although means tended in the same direction differences were not significant. Thus, variables that increase motivation to process a minority message may also bolster majority influence, but to a lesser extent since majority support for counter-attitudinal positions in itself motivates to engage in systematic information processing (Baker & Petty, 1994; De Dreu & De Vries, 1993; Mackie, 1987).

Research by Nemeth and colleagues shows that when people process a minority message, they become, compared to a control condition, more original, more creative, and they develop a deeper understanding of the issue at hand (for reviews, Nemeth, 1986, 1995). Put otherwise, if a minority message is processed systematically, it often happens in a divergent manner—recipients consider alternative points of view including the minority position, think about the issue in an open-minded manner, and try to understand and perhaps falsify the minority position.

The research program by Nemeth and colleagues on convergent-divergent thinking did not consider attitude change. However, De Dreu and De Vries (1993, 1996; De Vries *et al*., 1996) argued that convergent processing of (majority) arguments stimulates change on the focal attitude issue because this is what people concentrate on. Thus, majority influence is more likely on the focal rather than related issue because majority arguments are processed in a convergent way. Divergent processing of (minority) arguments, on the other hand, opens up one's frame of reference, and enables one to see connections with related attitude topics. Divergent thinking more than convergent thinking allows attitude change to spread out to other issues than the

focal one only. Minority influence, if it occurs, is likely on related issues because minority arguments are processed in a divergent way. In addition, attitude change on the focal issue implies (unwanted) identification with the (aversive) minority, leading recipients to suppress change on focal issues in the case of minority influence (Mugny, Kaiser, Perez, & Papastamou, 1984). Hence, minority influence is more likely on related issues than on focal issues, due to a combination of divergent thinking and avoidance of identification with the minority source.

There is correlational evidence consistent with the argument that majority influence (on the focal issue) occurs because of convergent thinking while minority influence (on related issues) occurs because of divergent processing. De Dreu and De Vries (1993, Experiment 2) and Gordijn, De Vries and De Dreu (manuscript submitted for publication, Experiment 1) observed the predicted positive correlation between convergent thinking and attitude change on the focal issue, and between divergent thinking and attitude change on related issues. Because convergent and divergent thinking were assessed after the attitude measures, there is a problem of causality—it cannot be excluded that attitude change on the focal (related) issue caused convergent (divergent) thinking. In another study (De Dreu & De Vries, 1996), positive correlations between reading time (a measure of systematic information processing, e.g. Petty & Cacioppo, 1986) and attitude change on the focal issue was found in the case of majority influence, and between reading time and attitude change on the related issue in the case of minority influence. De Dreu and De Vries inferred from these results that reading time reflected the convergent processing in the majority influence condition, and divergent processing in the minority influence condition. Unfortunately, they did not have additional measures to validate this inference.

THE PRESENT STUDY

In the current study we used experimental manipulations to motivate recipients to engage in convergent or divergent processing of majority or minority arguments. In a no-instructions condition in which recipients were not explicitly motivated to process information in a systematic way, we expected to replicate prior research. Because no processing motivation is elicited, counter-attitudinal minority arguments will be ignored and no influence will be observed (cf. Baker & Petty, 1994; De Dreu & De Vries, 1993; Mackie, 1987). Because a counter-attitudinal majority elicits systematic, convergent information processing majority arguments will lead to positive attitudes (i.e. in line with the advocated position) on focal issues more than on related issues. Thus, Hypothesis 1 predicts that in the no-instructions condition attitudes will be more positive on the focal as compared to the related issue, but *only* in the case of majority arguments.

In the condition in which recipients were motivated to engage in convergent processing, we expected a similar pattern as in the no-instructions condition. Motivating participants to engage in systematic, convergent processing in the case of majority support does not add much to what recipients would do spontaneously. In the case of majority support, we thus expect more positive attitudes on focal rather than related issues. Motivating recipients to engage in systematic, convergent message processing in the case of minority support, however, alters what recipients are

expected to do spontaneously (i.e. neglect the message), but as recipients also avoid identification with the minority source, convergent processing is unlikely to produce substantial change on the focal as compared to the related issue. Thus, Hypothesis 2 predicts that in the convergent processing condition focal attitudes will be more positive than related attitudes, especially in the case of majority rather than minority support.

In the condition where we motivated recipients to engage in systematic but divergent thinking, we expected a substantially different pattern than in the no instructions and convergent processing conditions. In the case of majority arguments, which by itself should produce positive attitudes on focal but not related issues due to convergent processing, one would expect the divergent instructions to stimulate attitude change on related issues in particular. Hence, divergent processing of majority arguments would produce positive attitudes on both the focal and the related issue. In the case of minority arguments, in contrast, divergent processing instructions should produce positive attitudes on related issues in particular, as attitude change on focal issues is suppressed in order to avoid identification. Thus, Hypothesis 3 predicted that divergent processing leads to more positive attitudes on the related as compared to the focal issue in the case of minority but not majority support.

Because this is the very first study to manipulate convergent and divergent processing of persuasive arguments, we first conducted a pilot study to assess the effects of these manipulations on a number of variables that may interfere with the testing of our hypotheses. For example, it is unknown whether convergent as compared to divergent processing is more difficult, causes more or less positive or negative thoughts, influences judgments about argument quality, or affects identification with the source.

PILOT STUDY

Convergent and divergent information processing are rather hybrid constructs. In past research these constructs have been measured in a variety of ways. For example, Nemeth and Kwan (1985), and De Dreu and De Vries (1993, Experiment 1) operationalized convergent–divergent thinking as the number of novel associations with a topic that participants generated; novelty being defined as uniqueness, i.e. not being generated by any other participant. Nemeth and Kwan (1987; see also Butera & Mugny, 1996) operationalized convergent–divergent thinking as whether or not one follows the line of thinking suggested by the influence source, a method that has led Mackie (1987) and De Dreu and De Vries (1993, Experiment 2) to operationalize convergent–divergent thinking as generating supportive arguments versus counter-arguments. Trost *et al*. (1992) tended to equate convergent thinking with message-related, and divergent thinking with issue-relevant processing. In other words, convergent–divergent processing has something to do with low–high *originality*, with positive or negative *valence*, and with *message-focused* versus *issue-related*.

To capture these various aspects of convergent and divergent message processing, we asked participants in the convergent processing condition to generate two new supportive arguments for the position advocated in the persuasive message, while we asked participants in the divergent processing condition to generate two alternative

solutions for the problem noted in the message. By doing so, we tried to elicit a somewhat greater message focus in the convergent processing condition and a greater issue focus in the divergent condition (originality covaries with message versus issue related processing, almost by definition). It cannot be excluded that instructions induce more positive versus negative thinking, in the convergent versus divergent processing conditions, respectively. The critical test is whether these differences affect attitudes and increase the tendency to identify with the source, as this would provide an alternative explanation for our data. Also, it could be that the convergent processing instructions are easier to comply with, as would be manifested in shorter processing time and self-reported task-difficulty. These issues were all examined in the pilot study.

Method

Design and Participants

In the pilot study Information Processing (Convergent versus Divergent versus No-Instructions) was manipulated between-subjects. Dependent variables were reported difficulty of information processing, time needed to process information, judgment of argument quality, identification with the source, estimates of the numerical support for the arguments, and the number of positive, negative, neutral and irrelevant thoughts and attitudes on the focal issue.

Participants were fifty male and female undergraduate students at the University of Groningen, who received 10 Dutch guilders (approx. US$6) for participation. Participants were recruited in university restaurants and asked to participate in an opinion survey.

Procedure

Upon arrival in the laboratory, subjects were seated in front of a computer which displayed all information and questions. Responses had to be communicated via the keyboard. After brief instructions regarding computer use, participants were told that part of the study was concerned with students' opinions about the way undergraduate programs at the university were organized. Subsequently, participants received four arguments supporting an increase in study load for most undergraduate programs at the university. These arguments were: 'Study load should increase because (1) it will help to increase the value of a Bachelor's Degree; (2) it increases chances of finding a job; (3) it reflects the demands you will encounter after university; and (4) it helps to positively differentiate between University and Community College.' (In a different study with participants from the same population, these arguments were judged as valid, correct, and of good quality (Schuurman, Siero, De Dreu, & Buunk, 1995.)

Participants in the *convergent processing* condition were asked to 'read these four arguments carefully and to provide two new arguments that support the viewpoint underlying these statements. You need not fully agree with the arguments that you generate, as long as you think they are good and valid ones. As an example, suppose that the arguments state that we need more trains between Amsterdam and

Rotterdam because more people travel these days, you could additionally argue that more trains allow people to plan their trips in a more flexible way.' Thus, in the convergent processing condition, we stimulated participants to assume the advocated position and to generate new, supportive arguments. In contrast to this, participants in the *divergent processing* condition were asked to 'read these four arguments carefully and to provide two alternative solutions to the problem these arguments are dealing with. As an example, suppose that the arguments state that we need more trains between Amsterdam and Rotterdam because more people travel these days, you could alternatively propose to stimulate car pooling.' Thus, in the divergent processing condition, we stimulated participants to take another look at the issue and to consider alternatives to the advocated position. Finally, participants in the *No-Instructions* condition were not told anything. They simply received the four arguments and were asked to press return when they desired to go to the next page.

Dependent Variables

When participants completed their tasks, they pressed 'Return' to go to the next page on the computer. The computer registered the time passed by (processing time). Subsequently, we measured (focal) attitudes with two statements to which participants could give their (dis)agreement: (1) it is a good idea to increase study load; and (2) the number of hours per course credit should be reduced (reverse scored) (always $1 =$ totally disagree, to $7 =$ totally agree). Ratings were correlated ($r = 0.50$) and averaged into one single index (analyses on the separate ratings led to identical conclusions).

We also asked participants how easy or *difficult the task* was they just completed ($1 =$ very easy, to $5 =$ very difficult), and how pleasant it would be to be *identified* with the people who advanced the arguments just presented ($1 =$ not pleasant at all, to $5 =$ very pleasant). Third, we asked how correct, valid, interesting, intelligent and good the *arguments* were (all $1 =$ not at all, to $5 =$ very much; ratings were averaged into one index; Cronbach's alpha $= 0.76$). Fourth, we asked participants to *estimate the percentage* of undergraduate students that would support an increase in study load. Finally, we asked participants to type in the *thoughts* they had had while reading the arguments. We gave participants five boxes to 'type in any thoughts you had while reading the four arguments about study load'. These thoughts were coded by two judges blind to hypotheses and experimental conditions as 'positive' (favoring an increase in study load), 'negative' (opposing an increase in study load), 'neutral' (dealing with study load, but opposing not favoring it), and 'irrelevant' (not dealing with study load). Coders corresponded reliably, with Cohen's Kappa $= 0.79$ (differences were resolved through discussion).

Results and Discussion

To check the adequacy of the manipulation of Information Processing, we verified whether participants in the convergent processing conditions generated new supportive arguments, while those in the divergent processing conditions generated alternative solutions. In the convergent processing condition, 86 per cent of the

participants generated two new supportive arguments, and 12 per cent generated one new supportive argument. The remaining 2 per cent generated supportive arguments that were almost identical to those listed in the message. In the divergent processing condition, 81 per cent of the participants generated at least one alternative solution (36 per cent generated two alternative solutions), and 19 per cent generated ideas oriented towards falsification of the message content. That not all participants generated two alternative solutions could reflect the fact that this was a rather difficult task to do.

Table 1 presents the number of participants and cell means for all dependent variables, as well as the univariate *F*-tests. As can be seen, participants' processing time did not differ between the convergent and divergent processing conditions (both did differ from the no-instructions condition, which is obvious). Participants did not perceive the processing task as more difficult, and they did not generate more neutral, irrelevant, or positive thoughts; only the number of negative thoughts was slightly higher in the divergent processing condition than in the convergent processing and no instructions condition. Also, convergent processing led to more positive attitudes than divergent processing, which in turn produced more positive attitudes than no processing instructions. These effects show that not stimulating people to process the message leads to less positive attitudes than stimulating them to do so, and that stimulating people to process the message in a convergent way leads to more change than stimulating them to process it in a divergent way.

The reader may wonder how attitudes may change in the absence of any source. Research on so-called self-persuasion suggests, however, that whenever people generate arguments for a particular position attitude change may occur (Gordijn, Postmes, & De Vries, manuscript submitted for publication; for a review, see Eagly & Chaiken, 1993). In a sense, the convergent processing condition resembles the standard 'self-persuasion' set-up to a greater extent than the divergent processing condition, and as such it is interesting to note the more positive attitudes in the former situation.

Table 1. Effects of information processing on perceived task difficulty, identification, judgment of argument quality, and estimates of numerical support

	Information processing			
	Convergent	Divergent	No instructions	$F(2,47)$
Cell *N*	16	17	17	—
Task difficulty	3.75	3.71	3.41	<1
Processing time	255.12^{a}	313.90^{a}	27.90^{b}	28.72^{**}
Positive thoughts	1.00	0.77	0.77	<1
Negative thoughts	0.94_{y}	1.76_{x}	1.06_{xy}	2.36^{*}
Neutral thoughts	0.81	0.63	0.62	<1
Irrelevant thoughts	0.32	0.31	0.26	<1
Identification	2.62	2.35	2.58	<1
Argument quality	3.86	3.74	3.71	<1
Numerical support	40.12%	31.18%	32.94%	1.02
Attitudes	4.95^{a}	4.01^{b}	3.39^{c}	8.88^{**}

Note: Processing time is measured in seconds. $^{**}p < 0.001$, $^{*}p < 0.10$; Cell means per row with a different *super*script (a,b,c) differ at $p < 0.05$; Cell means per row with a different subscript (x,y,z) differ at $p < 0.10$.

As can be seen in Table 1 as well, the experimental manipulation had no effect whatsoever on identification, on judgments of argument quality, and on estimates of numerical support. Note that arguments were evaluated rather positively, and that estimated support was relatively small. Taken together, the pilot study shows very little differences between convergent and divergent processing instructions in terms of task difficulty and pleasantness, or in terms of other variables that may interfere with a proper test of our hypotheses (e.g. identification, judgment of argument quality, and estimates of numerical support). Therefore, we decided to use this manipulation of convergent and divergent processing in the main study as well.

MAIN STUDY

Method

Design and Participants

The design was a 2×3 factorial between-subjects, involving Numerical Support (Majority versus Minority) and Information Processing (Convergent versus Divergent versus No-Instructions Control). Dependent variables were attitudes on the focal issue (study load) and on the related issue (necessity of engaging in side-activities, see below), as well as judgments of argument quality, identification with the source, and manipulation checks. To obtain base-rate information about attitudes on the focal and related issue, we asked an additional 16 subjects about their attitudes without exposing them to the experimental manipulations or the persuasive arguments.

One hundred and twenty-one psychology undergraduates participated in the experiment, for which they received 10 Dutch guilders (approx. US$6). As in the pilot study, participants were invited to participate in an opinion survey. Participants were randomly allocated to conditions.

Procedure and Manipulation of Independent Variables

The procedure started as in the pilot study. In the *base-line* condition, participants received the attitude questions immediately following the general instructions regarding computer use (the attitude items are discussed under 'Dependent Variables'). In the experimental conditions, prior to the presentation of the arguments (and the manipulation of Information Processing), participants received the manipulation of *Numerical Support*. Participants were told that a large number of students had already participated in the survey, and that it appeared that the majority of 82 per cent (a minority of 18 per cent) of those that participated so far favored an increase in study load. They were told that on the next computer screen, they would receive the four arguments most often advanced by this majority (minority) supporting an increase in study load. Subsequently, participants received the four arguments concerning study load, and the manipulation of *Information Processing* was induced as in the pilot study. Some participants were instructed to type in two new supportive arguments (convergent processing), some were asked to generate two

alternative solutions (divergent processing), and some were not given any processing instruction (No-Instructions Control). As in the pilot study, we *measured the time* participants used to do the processing task.

Following these manipulations, participants responded to a series of attitude questions (tapping into ideas about the focal and the related issue). After they responded to further dependent measures (see below), they were debriefed and paid for participation.

Dependent Variables

Attitudes about an increase in study load (the focal issue) were assessed with six statements to which participants could give their (dis)agreement:

(1) It is a good idea to increase study load.
(2) It is all right to demand more from students than is done right now.
(3) The number of hours per course credit point should be reduced (reverse scored).
(4) Lectures should become more difficult and challenging.
(5) As far as I'm concerned, undergraduate programs may become heavier.
(6) The number of credit points one needs to finish an undergraduate program should increase (all items: 1 = totally disagree, to 7 = totally agree).

Ratings were correlated and averaged into one focal attitude index (Cronbach's alpha = 0.81).

We pretested several related issues with an independent sample of thirty psychology students prior to the experiment. For each related issue, we asked these pretest subjects to (1) indicate their (dis)agreement on a 7-point Likert-scale, and (2) to indicate the extent to which they thought the issue had something in common with and was related to study load in the university programs (1 = has nothing to do with, to 7 = has everything to do with). The related attitude we selected was about the importance of engaging in side-activities during one's undergraduate studies (e.g. chairing a committee, making extended trips abroad, reading literature). It was measured with two items: (1) A student who only knows something about his or her discipline and about nothing else is a bad student, and (2) It is important to engage in side-activities and to broaden one's horizon (both: 1 = totally disagree, to 7 = totally agree). In the pretest, this issue was moderately related to the focal issue ($M = 4.13$, $SD = 0.84$), and attitudes were moderately correlated with those on the focal issue, $r(30) = 0.35$. This means that the more students favored an increase in study load, the higher they valued side-activities to broaden one's horizon. At first it may seem odd that one favors an increase in study load (implying that one needs more time to study) and at the same time wishes to broaden one's horizon by employing side activities. However, underlying both viewpoints is the desire to become a fully equipped and sophisticated academic, rather than either a onetrack specialist or a bohemian with a worthless degree. In the main experiment, we assessed this related attitude with the same two statements, and because ratings were correlated ($r = 0.53$), we decided to average them into one related attitude index.

Following the measurement of the focal and related attitude, we concluded the experiment by measuring *identification with the source*, and *judgment of argument quality*, using the same items as in the pilot study.

Results

Manipulation Checks

To check the adequacy of the manipulation of Numerical Support, we asked participants in the experimental conditions to type the percentage of students they thought were in favor of increasing study load. A 2×2 (Numerical Support $\times$ Information Processing) Analysis of Variance (ANOVA) on these percentages gave a main effect for Numerical Support, $F(1,95) = 147.11$, $p < 0.001$. Participants in the majority conditions gave higher percentages ($M = 76.83$) than participants in the minority conditions ($M = 24.56$). There were no effects for Information Processing, $F(2,95) = 1.31$, ns, or for the Numerical Support $\times$ Information Processing interaction, $F(2,95) = 2.76$, ns.

To check the adequacy of the manipulation of Information Processing, we verified whether participants in the convergent processing conditions generated new supportive arguments, while those in the divergent processing conditions generated alternative solutions. As in the pilot study, this was the case: 81 per cent of the participants in the convergent processing condition generated two new supportive arguments, 13 per cent generated one new supportive argument, and the remaining 6 per cent generated two arguments that were supportive but very similar to those listed in the source's message. Seventy-six per cent of the participants in the divergent processing condition generated one alternative solution, and 20 per cent generated two alternative solutions. The remaining 4 per cent generated ideas oriented towards falsification of the message. These percentages did not vary as a function of numerical support, all $\chi^2 < 1$, ns.

Descriptive Statistics

Table 2 summarizes the correlations between the dependent variables in the experimental conditions. As can be seen, focal and related attitudes were not correlated, which may be due to the fact that processing instructions exert differential influence on changes in the focal and the related issue. Indeed, in the baseline condition focal and related attitudes were positively correlated, $r(19) = 0.41$, $p < 0.05$ (one-tailed). This corroborates our pretest findings. Another interesting observation is that attitudes on the focal issue correlate negatively with processing time. This may be due

Table 2. Correlations between dependent variables (baseline condition excluded)

	1	2	3	4	5
1. Focal issue	1.00	0.06	0.45**	0.16	−0.19*
2. Related issue		1.00	−0.14	−0.10	−0.01
3. Identification			1.00	0.36**	−0.11
4. Argument quality				1.00	0.03
5. Processing time					1.00

Note: $^{*}p < 0.10$ $^{**}p < 0.01$ ($N = 101$). Focal and Related Attitudes are standardized scores, with higher scores indicating more argeement with the source.

to the fact that divergent processing increased processing time and produced less positive attitudes on the focal issue (see also below).

Attitudes

Table 3 presents the observed cell means for focal and related attitudes per experimental condition. Because we wished to compare focal and related attitudes directly but the mean and distribution of the attitude scores on these two measures differed from one another, we standardized attitude scores for each measure separately, using data from all conditions including the base-line. A 2 (numerical support) $\times 3$ (instructions) $\times 2$ (attitude issue: focal/related) Analysis of Variance with the last factor within-subjects revealed a main effect for numerical support, $F(1,95) = 9.77$, $p < 0.002$, an interaction between numerical support and attitude issue, $F(1,95) = 5.05$, $p < 0.021$, an interaction between instructions an numerical support, $F(2,95) = 3.06$, $p < 0.05$, and an interaction between instructions and attitude issue, $F(2,95) = 6.94$, $p < 0.002$. Cell means are presented in Table 3. Because our hypotheses pertained to effects within (rather than between) processing conditions, we proceeded by analyzing focal and related attitudes as a function of numerical support per information processing condition (Rosenthal & Rosnow, 1985). Thus, hypotheses were tested in simple effects analyses for standardized focal and related attitudes per information processing condition in a 2 (Numerical Support: Majority versus Minority) $\times 2$ (Attitude Issue: Focal versus Related) Analysis of Variance.

In the case of *no-processing instructions* attitude issue gave no main effect, $F(1,95) < 1$, ns. The main effect for numerical support, $F(1,95) = 8.52$, $p < 0.004$ showed that on average majority arguments were more influential than minority arguments. A significant numerical support $\times$ attitude issue, $F(1,95) = 3.65$, $p = 0.05$, qualified this effect. As can be seen in Table 3, majority arguments led to somewhat more positive attitudes, i.e. more persuasion, on the focal rather than related issue, $t(15) = 1.70$, $p < 0.10$; for minority arguments no differences between focal and related attitudes emerged, $t(16) = -0.87$, ns. This pattern is consistent with

Table 3. Standardized means (observed means) for focal and related attitudes as a function of numerical support and processing instructions

	Information-processing instructions						
	No instructions		Convergent processing		Divergent processing		
	Majority	Minority	Majority	Minority	Majority	Minority	Baseline
N	16	17	20	16	16	16	16
Focal issue	0.70a	−0.36b	0.64a	−0.06b	−0.21b	−0.56b	−0.23b
	(4.25)	(3.16)	(4.18)	(3.47)	(3.32)	(2.96)	(3.31)
Related issue	0.20ab	−0.06ab	0.06ab	−0.46a	−0.01ab	0.43b	−0.15ab
	(6.25)	(5.97)	(6.10)	(5.35)	(6.03)	(6.50)	(5.86)

Note: Numbers in parentheses are observed means, and higher numbers indicate greater agreement with the source position (1 = totally disagree, to 7 = totally agree). Cell means per row not sharing a similar superscript differ at $p < 0.05$, according to a Newman–Keuls using a seven-group One-way Analysis of Variance.

Hypothesis 1. Moreover, comparison with the baseline reveals that when people are not explicitly motivated to engage into systematic processing, minority arguments are ignored and exert no influence whatsoever.

In the case of *convergent processing*, the main effect for attitude issue was significant, $F(1,95) = 6.47$, $p < 0.016$, showing that attitudes on the focal issue were more positive than on the related issue. An additional main effect for Numerical Support, $F(1,95) = 8.20$, $p < 0.005$, showed that majority influence produced more positive attitudes than minority arguments (majority arguments also elicit more positive attitudes than those in the baseline condition, see Table 3). Thus, consistent with our second hypothesis, convergent processing of majority arguments produces more positive attitudes on focal as compared to related issues, $t(19) = 2.60$, $p < 0.018$, an effect which is weaker (and non-significant) in the case of minority arguments, $t(15) = 1.22$, $p < 0.24$.

In the case of *divergent processing*, the main effect for attitude issue was significant, $F(1,95) = 9.62$, $p < 0.004$, this time showing that attitudes on the related issue were relatively *more* positive than attitudes on the focal issue. The predicted numerical support $\times$ attitude issue interaction approached significance, $F(1,95) = 3.40$, $p < 0.07$, and showed that the effect for attitude issue was significant in the case of minority arguments, $t(15) = -4.08$, $p < 0.001$. Although majority arguments produced the expected no-difference between focal and related issue, $t(15) = -0.70$, ns, comparison to the baseline revealed that attitudes were less positive than expected. In fact, majority influence under divergent processing seems absent at both the focal and the related issue.

Identification

A 2×3 ANOVA gave a main effect for Numerical Support, $F(1,95) = 4.92$, $p < 0.029$, showing that recipients were less aversive of being identified with the majority ($M = 2.63$) than with the minority ($M = 2.14$). Consistent with the pilot study, we found no effects for Information Processing, or the interaction between Numerical Support and Information Processing, both Fs < 1.20, ns.

Identification was positively correlated with attitudes on the focal issue, $r(101) = 0.45$, $p < 0.002$. No correlation was found between identification and attitudes on the related issue, $r(101) = -0.14$, ns (see Table 2; because of the low number of observations per condition, we refrained from analyzing correlations per condition separately). This is consistent with the argument that attitude change on the focal issue, but not on the related issue, may be enhanced (suppressed) due to the desire (aversion) of being identified with the majority (minority).

Judgment of Argument Quality

A 2×3 ANOVA gave no effects whatsoever for the independent variables. Arguments were perceived as of good quality ($M = 3.75$, with $5 =$ excellent).

Processing Time

A 2×3 ANOVA on processing time only gave a main effect for Processing Instructions, $F(2,95) = 48.99$, $p < 0.001$. Divergent processing instructions produced the longest processing time ($M = 399.63$), albeit not significantly longer than convergent processing instructions ($M = 258.03$). Both instruction conditions differed significantly from the no instructions control condition ($M = 29.21$; ps < 0.001). There were no main or interaction effects involving numerical support (simple effect analysis within processing conditions revealed no differences either).

De Dreu and De Vries (1996) reported positive correlations between reading time and attitudes on the focal issue in the case of majority support, and between reading time and attitudes on related issues in the case of minority support. To examine this issue in the current experiment, we calculated correlations between focal and related attitudes on the one hand, and processing time on the other in the majority conditions (excluding the divergent processing condition) and in the minority condition (excluding the convergent processing condition). These analyses showed a nonsignificant correlation between processing time and focal attitude in both the majority condition, $r(36) = -0.10$, and the minority condition, $r(33) = -0.16$. This is inconsistent with past research which reported a positive correlation in the case of majority arguments. Interestingly, however, the correlation between processing time and related attitudes was significant and *negative* in the majority condition, $r(36) = -0.40$, $p < 0.015$, and nonsignificant but *positive* in the minority condition, $r(33) = 0.26$, $p < 0.075$ (one-tailed). These data replicate our earlier study, and are consistent with the notion that majority-induced convergent processing 'distracts' from change on related attitudes, while minority-induced divergent processing 'adds to' change on related attitudes.

GENERAL DISCUSSION AND CONCLUSIONS

This study departed from the robust observation that (1) majority influence elicits convergent information processing and produces attitude change especially on focal issues, (2) minority influence occurs to the extent that circumstances and/or internal drives motivate recipients to engage in systematic information processing, and (3) when minority influence occurs, it produces divergent thinking and attitude change especially on related issues (De Vries *et al.*, 1996; Nemeth, 1995; Wood *et al.*, 1994). The question we were concerned with was whether majority influence on focal issues occurs *because* of convergent processing while minority influence on related issues occurs *because* of divergent processing.

This question was addressed by manipulating numerical support for persuasive arguments (majority versus minority) and information-processing strategies (convergent versus divergent versus a no-processing instructions control). In keeping with Hypothesis 1, results showed that when recipients are not explicitly motivated to process information in a systematic way, counter-attitudinal majority arguments produce more positive attitudes on the focal rather than related issue, while minority arguments have no effects whatsoever on either attitude issue. This pattern is

consistent with past research by Mackie (1987), De Dreu and De Vries (1993), and Baker and Petty (1994).

Consistent with Hypothesis 2, *convergent* processing produced more positive attitudes on the focal rather than related issue, and majority influence exceeded minority influence. This data pattern is consistent with the idea that majority influence produces more positive attitudes on the focal issue than on related issues because of convergent processing. Indeed, only in the majority condition clearcut differences between focal and related issue were found.

Consistent with Hypothesis 3, we found more positive attitudes on the related issue than on the focal issue when recipients were motivated to engage in *divergent* processing. This effect of divergent thinking was somewhat stronger in the case of minority arguments, probably because (resistance to) identification prohibits attitude change on the focal issue. This pattern of results is consistent with the idea that if people consider a minority message, they do so in a divergent way which leads to more positive attitudes on related issues in particular. The only significant difference between processing instructions on the related issue is found in the minority source condition, lending further support to the notion that indeed divergent thinking leads to persuasion on related issues in the case of minority support.

An interesting finding was that divergent processing of majority arguments resulted in virtually no influence on either issue. We can only speculate about the reasons for this unexpected result. It could be that the divergent processing instructions induced a sense of creativity and originality that renders one resistant to majority influence. If this is true, however, one would have expected some change on related issues nevertheless, as related issues are less subject to identification pressures. Another possibility is that divergent processing of majority arguments is at odds with what recipients of majority messages do spontaneously, i.e. to engage in convergent processing. Perhaps that engaging recipients into a processing mode that is contrary to their natural inclination confuses them, resulting in no attitude change at all. Future research is needed (1) to replicate this unexpected finding, and if replicated (2) to examine why divergent processing of majority arguments blocks any influence on both focal and related attitudes.

Theoretical Implications and Questions for Future Research

Results support Hypotheses 1 and 2, and provide partial support for Hypothesis 3. As such, the current study makes several contributions to our understanding of the processes underlying majority and minority influence. The most important contribution is that this is the first study to suggest that (majority-induced) convergent thinking may *cause* attitude change on focal issues more than on related issues, while (minority-induced) divergent thinking may *cause* attitude change on related issues. The first part of the statement is based on the fact that the pattern of majority influence in the no-instructions conditions is highly similar to that observed in the convergent processing conditions, together with the observation in past research that majority influence of itself produces convergent processing of information. The second part of the statement is based on the fact that the pattern of minority influence in the divergent processing conditions is highly similar to

findings obtained in past research when recipients are actually stimulated to process information systematically (e.g. De Dreu & De Vries, 1993; see also Wood *et al.*, 1994) and on the past finding systematic processing of minority arguments occurs in a divergent way (e.g. Nemeth, 1995).

A second contribution of the current research is that it further highlights the link between identification with the source and attitude change on the focal and related issue. Consistent with recent research by Wood *et al.* (1996; see also David & Turner, 1996) we found positive correlations between attitudes on the focal issue and identification with the source, and that people are less aversive of identification with a majority rather than minority source (David & Turner, 1996; Mugny *et al.*, 1984). Thus, we may conclude that minorities have such a small impact on attitudes on the focal issue not only because of divergent thinking but also because of increased aversion of identification with the source. It should be noted, however, that these conclusions are based on correlational evidence, and that research is needed to assess the causal effects of differential identification with the majority or minority on attitude change on focal and related issues.

Comparing the mean attitudes on the focal issue in the pilot study with those in the main experiment suggests less attitude change in the main study (i.e. $M = 4.11$ versus $M = 3.52$). At first sight, this may seem odd as the pilot study gave persuasive arguments only while the main study also provided recipients with information about the source of these arguments. Interestingly, however, these data closely resemble a pattern of findings obtained by Erb, Bohner, Schmaelze, and Rank (1988). These authors found that recipients engage in more thorough, systematic information processing when numerical support for the position advocated was absent rather than present—majority support helps people to accept heuristically the advocated position, while minority support helps people to reject heuristically the message. Thus, although a comparison between the pilot and main study should be made cautiously, we have some evidence to conclude that the mere availability of numerical support information reduces the amount of systematic processing, be it convergent or divergent, which in turn prohibits *substantial* change in attitudes.

Both our pilot study and the main experiment suggested that divergent processing instructions were more difficult to comply with than convergent processing instructions: the task of generating two supportive arguments (convergent processing) was performed much better than generating two alternative solutions for the problem mentioned in the persuasive message (divergent processing). In addition, processing time was (nonsignificantly) longer in the divergent processing conditions than in the convergent ones. Although it is reasonable to assume that divergent processing is more difficult by its very nature, task difficulty may influence attitudes (Waenke, Bless, & Biller, 1996). The more difficult a task is, the more likely it is that recipients become uncertain about their own attitudes; recipients may reason like 'If it is so difficult to generate new arguments, or alternative solutions, I must lack substantial knowledge about this issue'. Reduced confidence in turn opens up the possibility for attitude change towards the advocated position (cf. Eagly & Chaiken, 1993). Seen this way, divergent processing, being more difficult than convergent processing, reduces confidence to a greater degree and should result in greater attitude change. However, no such effect was observed in either the pilot study or the main experiment. Hence, we conclude that differences in task difficulty between convergent and divergent message processing do not contribute to attitude change.

If minority influence provides the basis for attitude change in small groups and larger societies (cf. Moscovici, 1980), then the question becomes when and how minority influence on related attitudes measured in private translates into change on focal issues measured in public. Given our increased understanding of the processes underlying majority and minority influence on focal and related attitudes, we need to increase our understanding of the ways in which change on related attitude affects focal attitudes, and of the ways in which aversion of identification with the minority source becomes less of a barrier in attitude change on focal issues. We would encourage research taking a more longitudinal perspective on majority and minority influence on focal and related issues. In particular, it would be interesting to see whether minority influence on related issues persists over time, and is responsible for the overall change in attitudes we witness in small groups as well as in society at large.

Limitations

The focal issue in the main experiment was clearly counter-attitudinal for most recipients, while the related issue was not. This may limit the generality of our findings, in that the pattern of data would have been different had the related issue been counter-attitudinal as well. It is difficult to see in what way, however, as we know little about the way focal and related attitudes are connected and influence one another. Future research could take up this issue by controlling the discrepancy between recipient and source on both focal and related issue.

Another limitation is that we used one operationalization of convergent and divergent processing, and thus face the risk of a mono-operation bias (Cook & Campbell, 1978). In addition, the reader could argue that we manipulated only more or less important components of convergent and divergent thinking, but were unable to fully operationalize these hybrid constructs. Although we would agree with such an argument, we also believe in the validity of the current manipulations. Convergent and divergent processing instructions resulted in processing strategies that were highly similar to what has been observed in prior research. First, the pattern of attitudes following convergent processing is highly similar to that in the no-instructions control condition when we consider majority influence (which is supposed to elicit convergent processing *per se*; Nemeth, 1995). Second, the pattern of attitudes following divergent processing is highly similar to that observed in many studies on minority influence (e.g. Moscovici, 1980; Mugny, 1982; for reviews, see De Vries *et al*., 1996; Wood *et al*., 1994).

Our pilot study revealed few systematic differences in terms of self-reported task difficulty, processing time, identification, perceived argument quality, and estimates of numerical support for a discrepant point of view. Nevertheless, two observations are noteworthy. First, participants in the convergent processing conditions consistently complied with the instructions to generate two supportive arguments, while participants in the divergent processing conditions tended to generate one (instead of the required two) alternative solutions. In addition, a substantial number of participants in the latter condition generated ideas and arguments that falsified the position advocated in the persuasive message. In other words, the divergent processing instructions appeared (1) to be more difficult, and (2) to elicit more negative thoughts. These differences compared to convergent processing seem to be in line with

what Nemeth's theorizing would have predicted, and also match the finding that spontaneously generated divergent thoughts contain more negative and less positive elements than spontaneously generated convergent thoughts (Erb *et al.*, 1998; Gordijn *et al.*, manuscript submitted for publication). In a way, these differences corroborate the validity of our convergent/divergent manipulations. At the same time, however, they beg the question as to what extent the observed pattern of attitudes can be accounted for by the valence of thinking (positive versus negative), the nature of thinking (convergent versus divergent), or a combination of the two. Future research is needed to settle this issue.

A final issue we wish to note is that in the main experiment we did not trace thought listings to measure spontaneously generated convergent and divergent thoughts in the same way we did in past research and in the pilot study. The reason for this omission was that thoughts generated in the pilot study were sparse and rather difficult to code (valence was the best we could do with it), probably because participants lacked a motivation to generate arguments once again (they had already done so as part of the processing manipulation). A drawback of this procedure is that we were unable to test the full model, that (1) numerical support influences information processing which (2) produces attitude change on focal and related issues. As past research provided abundant evidence for the first step in this model—numerical support influences the nature of information processing—this issue may be less problematic than one may have thought at first sight.

Conclusions

Taken together, the current research provides further evidence for the role of convergent and divergent processing in attitude change on focal and related attitudes. It brings together various lines of research, to wit Moscovici and Mugny's research on indirect minority influence (Moscovici, 1980; Mugny, 1982; see also Wood *et al.*, 1994), research inspired by general theories of persuasion about the role of consensus information on systematic information processing and attitude change (Baker & Petty, 1994; Mackie, 1987; see also Eagly & Chaiken, 1993), and Nemeth's studies on convergent processing of majority positions and divergent processing of minority ideas. Our finding that convergent processing fosters attitude change on focal issues, while divergent thinking encourages attitude change on related issues allows us to conclude that while majorities change and *consolidate* individual judgments and attitudes through convergent processing, minorities change and *innovate* through divergent processing.

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