Cognitive Flexibility, Communication Strategy, and Integrative Complexity in Groups: Public versus Private Reactions to Majority and Minority Status

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Archival studies of political decision-making groups show that the public statements of policy makers in the majority are higher in integrative complexity than those of minority-faction or unanimous group members. However, whether these differences reflect policy makers’ private thoughts, or their public impression management strategies, cannot be inferred using only data from the public record. The experiment reported here established that in freely interacting groups composed of majorities and minorities, this pattern is obtained under private communication conditions as well as in public statements. Results suggest that cognitive flexibility in response to influence from insiders, rather than communication strategies designed to influence outsiders, underlies the differences observed.

INTRODUCTION

Researchers of majority and minority influence have traditionally been preoccupied with changes in targets’ opinions. In the typical study, the source or content of a message is manipulated and its impact on the target is assessed. To the extent

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that a shift in the target’s position occurs, evidence of influence is obtained. Over time, the findings of such studies have become increasingly clear: targets of majority influence tend to comply in public (Tanford & Penrod, 1984), but don’t necessarily change their private views (Moscovici, Lage & Naffrechoux, 1969). In contrast, targets of minority influence don’t usually conform in public, but are often privately swayed, either toward the minority position (Moscovici, 1980; Mugny, 1982; Wood, Lundgren, Ouellette, Busceme, Blackstone, 1994), or toward a broader range of alternatives than they would have considered beforehand (Doise & Mugny, 1984; Mosch, 1986; Smith, Tindale & Dugoni, 1996).

Although changes in targets’ opinions are the most commonly studied consequences of social influence, there are other effects as well. Messages conveyed by majorities and minorities are also processed in different ways (for a review see Moskowitz, 1996). For example, cognitive responses to majority messages are generally more effortful (Mackie, 1987), and more focused (Nemeth, 1986), than responses to minority messages. Targets of majority influence experience pressure to conform, and tend to focus exclusively on the majority message as a result (De Dreu & De Vries, 1993; Mackie, 1987; Nemeth & Wachtler, 1983; Trost, Maass & Kenrick, 1992). Responses to minority messages, in contrast, are generally characterized by greater cognitive flexibility than responses to majority messages (Moscovici, 1980; Nemeth & Kwan, 1987; Peterson & Nemeth, 1996), and may involve trying on multiple perspectives (Moscovici, 1980), searching for new information (Nemeth & Rogers, 1996), and discovering new solutions (Nemeth & Kwan, 1987; Van Dyne & Saavedra, 1996). As a result, whereas the impact of majority influence is most likely to be direct and publicly visible, the changes incited by minority influence are more likely to be private, and only indirectly related to the content of the minority position (Wood et al., 1994).

This evidence indicates that the targets of minority influence generate more ideas, and more classes of ideas, than the targets of majority influence (Moskowitz, 1996). However, recent findings suggest that majority and minority influence also differentially affect how targets reason about alternatives. For example, Peterson and Nemeth (1996) showed that targets of both majority and minority influence can learn to recognize multiple perspectives, but that the former are less able to keep both in mind simultaneously than the latter. Hence, minority influence might also facilitate integrative reasoning by majority members.

This possibility is supported by research on “integrative complexity,” which reflects decision makers’ tendencies to exhibit (a) conceptual differentiation (i.e., recognition of multiple perspectives), and (b) conceptual integration (i.e., recognition of trade-offs among them). In several studies now, majority members have exhibited greater integrative complexity than minority members in their public statements (Gruenfeld, 1995). However, in contrast to the cognitive-flexibility literature, which is based primarily on laboratory experiments, research on the integrative complexity of majorities and minorities has been purely archival. Specifically, differences in the integrative complexity of majorities and minorities have been observed in the U.S. Congress (Tetlock, 1983; Tetlock, Hannum &
Micheletti, 1984), the British House of Commons (Tetlock, 1984), the Senate Budget Committee (Staub, 1991), and the U.S. Supreme Court (Gruenfeld, 1995; Tetlock, Bernzweig & Gallant, 1985).

Although this finding is robust, its precise theoretical nature is not yet well understood. In contrast to the subjects of minority influence experiments, who generally receive information without interacting, members of policy making groups are both the receivers and transmitters of persuasive appeals; they are both targets and sources of influence. Hence, while the integrative complexity of their public statements might reflect their private cognitive responses to others’ influence attempts, it might also reflect their public communication strategies for attempting to influence others.

Indeed, there is considerable evidence that preparing to transmit messages can have independent effects on how information is both privately organized and publicly conveyed (for reviews see Wyer & Gruenfeld, 1994; 1995). For example, research on “cognitive tuning” shows that when subjects prepare to receive information from others they develop simple and loosely structured, hence more flexible, organizing schemas for that information than when they prepare to transmit information to others (for a review see Levine, Bogart & Zdaniuk, 1996). Specifically, “transmitter’s” cognitive structures are both more highly differentiated (i.e., contain a greater number of more specific categories), and more integrated (i.e., show greater interdependence among categories and greater organization around a single unifying aspect) than those created by “receivers” (Zajonc, 1960).

In policy-making groups, message receptions and message transmissions occur in tandem, and group members are likely to shift their focus from one to the other during different phases of the process. During the predecision period, when policy positions are being formulated, group members engage in dialogue that is ostensibly orchestrated to facilitate learning about policy options and their relative trade-offs. This should orient them toward receiving information. If group members attempt to influence one another and build coalitions around their preferred alternatives, they will also be focused on transmitting information. However, once a single policy is formally endorsed, and group members are committed to a particular outcome, the focus and tenor of these activities should shift (Tetlock, Skitka & Boettger, 1989). During this postdecision period, policy makers should be focused on transmitting information about the policy to external constituents who will be affected by its consequences. Hence, relative to predecision activities, during which majority and minority members are internally focused and interacting, postdecision activities should be characterized by a more exclusive external focus on communication targets outside the group.

The postdecision messages designed to influence outsiders might differ substantially in both content and structure from the predecision policy cognitions of those who transmit them. Such effects are routinely observed in studies of “accountability” (Tetlock, 1983), which show that decision makers who feel compelled to justify their views to others often publicly acknowledge the validity of perspec-
tives that they do not actually believe are valid, in order to make a positive impression on their audience (for reviews see Tetlock, 1991; 1992).

For example, the authors of Supreme Court opinions might couch their views in strategic rhetoric that allows them to anticipate and address the potential legal, social, economic or political consequences of their decision, even if those consequences were not an explicit reason for supporting it during group deliberations. The authors of majority opinions might concern themselves with specifying all imaginable contingencies under which the law should and should not apply to insure the longevity of their precedent. The authors of minority opinions, in contrast, might focus exclusively on arguments that could eventually facilitate the precedent’s overruling. In this way, the responsibility of policy making might lead to greater integrative complexity than the responsibility of policy opposition (cf., Tetlock, et al., 1985). If this were the case, the integrative complexity of published majority and dissenting opinions might differ from that of the cognitions on which justices’ policy preferences are based.

These considerations suggest that the integrative complexity differences between majority and minority members could be due to their mutual predecision influence on one another’s private cognitions, or their unique postdecision attempts to influence others through public communication strategies. Since prior research on these factors has relied exclusively on data from the public record, it has generally not been possible to distinguish between these psychological alternatives (cf., Tetlock et al., 1984; Gruenfeld, 1995).

The experiment reported here was designed to examine these alternatives under conditions in which their independent and joint effects could be evaluated. Toward that end, majority and minority members of non-unanimous groups and members of unanimous groups engaged in a judicial decision task and were asked to explain their preferences under either public or private communication conditions. In both conditions, subjects were personally anonymous. However, under public conditions, they were asked to consider the implications of their group’s decision for an external audience. Under private conditions, they were asked to respond as they would if they didn’t have to worry about how others would react to their views.

Alternative Hypotheses

As noted above, the difference in majority and minority members’ integrative complexity levels could occur via two psychological paths. The first path assumes that the effects of majority and minority status on integrative complexity occur prior to the group decision and that changes in cognitive flexibility occur after group members receive one another’s influence attempts. The second path assumes that the effects of majority and minority status on integrative complexity occur after the group decision and reflect group members’ unique reactions to their communication strategies for attempting to transmit the group’s outcome to outsiders. Evidence and arguments in support of each path are discussed in turn.
Cognitive-flexibility hypothesis. Theoretically, there are several reasons that the greater integrative complexity exhibited by majority members might reflect their underlying beliefs. As noted earlier, minority influence incites open mindedness among majority members. This is thought to occur because group members want to be accurate on the one hand, and to reject the minority on the other (Wood et al., 1994; Wood, Pool, Leck & Purvis, 1996). According to “conversion theory” (Moscovici, 1980), majority members resolve this tension by trying to “validate” the minority position, which involves considering its relation to the issue itself. Attempts at validation lead majority members to discover new dimensions of the problem and to understand the issue in new ways. Ultimately, these unintended cognitive consequences render the majority more susceptible to the minority position than they were beforehand, and leads to their private conversion (i.e., acceptance of the minority position).

Research on “divergent thinking” suggests that validation increases the majority’s tolerance for new alternatives in general, rather than the minority’s position per se (Nemeth, 1986). This work shows that subjects exposed to minority influence initially reject the minority proposal, and begin to search actively for new alternatives (Nemeth & Rogers, 1996; Nemeth & Wachtler, 1983), performance strategies (Nemeth & Kwan, 1987), and more creative solutions (Mucchi-Faina, Maass & Volpato, 1989; Van Dyke & Saavedra, 1996). To the extent that these activities increase awareness of multiple perspectives, they should increase cognitive differentiation by majority members. In addition, the fact that minority influence targets are better at keeping two perspectives in mind simultaneously suggests that they should also be better at conceptual integration than majority influence targets (Peterson & Nemeth, 1996). Thus, minority influence should increase integrative complexity in majority members (Gruenfeld, 1995).

In contrast, majority influence should decrease integrative complexity in minority members because it leads to an exclusive, “convergent” focus on the majority position. Theoretically, this occurs because alignment with the majority seems advantageous for both normative (social acceptance) and informational (accuracy) reasons (Asch, 1951; Deutsch & Gerard, 1955). A convergent focus precludes consideration of any alternatives, as well as continued exploration of the issue (Nemeth, 1986), thereby reducing the potential for both differentiation and integration.

It is important to note that majority members become cognitively flexible in response to minority influence. Hence, it is not only the case that majority members should exhibit higher integrative complexity than minority members, they should also exhibit higher integrative complexity than members of unanimous groups who, in the absence of minority influence, lack the catalyst for cognitive restructuring (Nemeth & Kwan, 1987). This pattern has already been observed in a content analysis of Supreme Court opinions, which are prepared specifically for the public record and are, by definition, written with certain audiences in mind. In that study, majority opinions written when the Court was not unanimous were more integratively complex than either minority (i.e.,
dissenting) opinions, or majority opinions written when the Court was unanimous (Gruenfeld, 1995).

To the extent that cognitive flexibility is responsible for the complexity levels exhibited by the authors of these documents, the same pattern of differences obtained in these published legal documents should occur when group members disclose their private views. That is, the integrative complexity exhibited by representatives of the majority should be greater than that exhibited by representatives of the minority, or that by representatives of unanimous groups, whether the authors are required to transmit their rationale for the group’s decision to an external audience (under public communication conditions), or are asked to informally disclose their thoughts (under private communication conditions).

Communication-strategy hypothesis. In contrast to the cognitive-flexibility hypothesis, the communication-strategy hypothesis suggests that group members’ integrative complexity levels reflect their public communication strategies, rather than their private thoughts. In this view, group members who are responsible for making policies that will be implemented (e.g., the majority), and are therefore responsible for explaining them to beneficiaries outside of the group, should exhibit greater integrative complexity when explaining those policies to an external audience than group members who personally opposed the adopted policy (e.g., the minority) and are therefore not accountable for either its meaning or its consequences.

As noted earlier, one reason this might occur is that policy makers in the majority are accountable to the voters who elect them for the consequences of policies that are actually implemented, and might display integrative complexity in attempt to anticipate and appease their constituents’ concerns (Tetlock, 1981; Tetlock et al., 1984). Accountability, defined as pressure to “maintain the positive regard of important constituencies” (Tetlock, 1992; p. 332), emphasizes concerns with social acceptance. However, majority and minority members are simultaneously susceptible to both normative and informational concerns (Deutsch & Gerard, 1955). While normative concerns might outweigh informational concerns in political bodies, the opposite is likely to be true in other kinds of groups.

This account was supported in a study of U.S. Senators (Tetlock et al., 1984). However, while it provides a sensible explanation for the behavior of elected officials, it is unclear whether accountability to constituents per se is the key driver for majority and minority influence sources more generally. Supreme Court justices for example, who are appointed for life by the President and are purposefully insulated from public opinion (Baum, 1989; Brenner & Spaeth, 1995), are decidedly not accountable in this purely political manner. In this type of group, accountability to external constituents is likely to invoke the informational pressures associated with policy making more generally, such as constructing a policy statement that accurately and effectively conveys the nature of new rules and the conditions under which they should be applied. On the Court, as in many policy groups, majority members, who are responsible for the consequences
of their policies on those affected by them, are also responsible for providing this kind of guidance.

To the extent that this leads to more carefully and thoroughly articulated postdecision messages, it should also be associated with greater integrative complexity among majority members than minority members. This argument is consistent with Zajonc’s (1960) finding that message “transmitters,” who expected to explain things to others, constructed more highly differentiated and integrated organizing structures for the information they had to convey than message “receivers,” who expected others to explain things to them.

However, contrary to the predictions based on cognitive flexibility arguments, this integrative complexity “advantage” should occur whether the majority represents a group that is unanimous, or one that is non-unanimous. The presence of a vocal minority is not necessary for postdecisional accountability to have the predicted effects. Rather, the transmitter orientation described above depends on (a) the presence of an external constituency, and (b) a sense of responsibility for group outcome. Majority and unanimous group members should be equally susceptible to these psychological states.

Furthermore, when considering the implications of this hypothesis, it is important to note that public communications often occur independently of decision makers’ private belief structures (Moscovici, Lage & Naffrechoux, 1969; Tetlock & Kim, 1987). For example, when accountability is manipulated after decision makers’ are committed to a particular outcome, subjects typically design their public statements to maximize audience acceptance, but remain true to their initial beliefs when asked to disclose them afterward in private (for a review see Tetlock, 1992). Such behaviors should not be observed when subjects express their views under private communication conditions in which no identifiable audience exists.

Correspondingly, in the groups studied here, integrative complexity is expected to be higher among majority members and people in unanimous groups, who are accountable for the group’s decision, than among minority members, who are not. However, to the extent that the effect is driven by postdecisional accountability and communication strategies alone, differences between majority and unanimous group members on the one hand, and minority members on the other, should only appear under public communication conditions. Under private communication conditions, transmitters of majority and unanimous group messages should not adjust their integrative complexity levels in response to the pressure of external accountability.

**Additive effects hypothesis.** A third theoretical possibility is that the effects of cognitive flexibility on integrative complexity and the effects of communication strategy on integrative complexity are additive. For example, it might be the case that the cognitive changes in response to majority and minority influence occur prior to strategic adjustments in the integrative complexity of public communication.

If both processes are operant, the following results can be expected. Under
private communication conditions, the cognitive-flexibility hypothesis should receive support. Specifically, majority members should express their views with greater integrative complexity than either minority members or members of unanimous groups. Under public communication conditions, however, the communication-strategy hypothesis should be supported. That is, majority and unanimous group members, who are equally accountable for the consequences of the group’s decision, should exhibit greater integrative complexity than minority members, who are less likely to feel accountable for those consequences.

Study Overview

These alternatives were examined under experimentally controlled conditions. Subjects in a laboratory experiment reported their individual preference for the outcome of a hypothetical legal case. This preference was used to assign the subjects to either unanimous or non-unanimous decision-making groups. Participants wrote rationales for their preferences both (a) before they were informed of their group membership, and (b) after the group task. In addition, two sets of rationale-writing instructions were administered. Subjects under private communication conditions were assured that their decision rationales would be anonymous and were told that the study’s success depended on their candor. Subjects under public communication conditions were urged to consider the impact of their arguments on hypothetical others who might draw on them as a basis for future decisions. The rationales were coded for integrative complexity.

METHOD

Overview

Participants reported their opinion concerning the policy of busing to achieve racial desegregation in public schools. They also wrote a rationale for this preference. Their position (pro vs. anti) was then used as a basis for assigning them to small decision-making groups that were either (a) unanimous, in favor of the busing policy, (b) unanimous, opposed to the busing policy, (c) non-unanimous, with a pro-busing majority and anti-busing minority, or (d) non-unanimous, with an anti-busing majority and pro-busing minority.

Group members were informed of one another’s positions spontaneously, through free-form interaction, and were asked to report the group’s final decision using a majority-wins rule. Afterward, each member wrote a second (post-decision) rationale for his or her position, taking into account what had transpired during the group interaction. Half of those rationales were written under public communication conditions and half were written under private communication conditions. A post-discussion questionnaire was then completed.

Rationales were coded for integrative complexity. The post-task questionnaire included measures of political attitudes and expertise, and attitudes toward busing.

Subjects and Design

Subjects were 280 introductory psychology students at a large midwestern university who participated in the study for course credit. They were assigned to one of 16 conditions in a 2 (public vs. private communication condition) × 2 (unanimous vs. non-unanimous distribution) × 2 (majority preference to affirm vs. overturn) × 2 (male vs. female sex) design. They were divided into 58 groups containing 3 to 7 members of the same sex that varied in terms of the distribution of members’ initial preferences.
Procedure

Instructions to individuals. Subjects were given an identification number when they entered the laboratory. When all subjects had arrived, they were told that the purpose of the study was to examine the psychological underpinnings of judicial decision making. They were instructed in single-sex groups of 18–20.

Next, a brief description of a controversial (hypothetical) legal decision was distributed. (The topic was chosen on the basis of pre-testing because it invoked a wide range of opinions among college undergraduates). The ruling described a Supreme Court decision that made busing mandatory for the purposes of racial desegregation where no alternative means was available. Subjects were asked to consider the ruling, and were given a sheet of paper asking for their “private” reactions to it.

The instructions (adapted from Tetlock et al, 1989) said:

Please describe your reactions to what you just read—that is, your thoughts and feelings about the case—in the space provided. In order for this project to succeed, we need to know what you think when you don’t have to worry about how other people will react to your views. Therefore, please respond with complete candor and honesty. To ensure complete confidentiality, write your subject number at the top of the page, not your name. Your data will be analyzed by another group of researchers who are not present today, and who specialize in analyzing these types of free response materials. Please write down all the thoughts and feelings you have about the issue.

After they had completed this private rationale, subjects were then given a judgment form with the following question at the top of the page:

If you were a member of the Supreme Court today, and you had the opportunity either to re-affirm or overturn the ruling that made busing mandatory in segregated school districts, how would you vote?

Subjects responded by checking either “re-affirm” or “overtum.” This preference was used as a basis for constructing decision-making groups with the desired distributions. While group assignments were being made in another room, participants completed a measure of general knowledge about the Supreme Court, and reported their attitudes toward and personal experience with busing as a means of desegregation.

Instructions to groups. All of these activities occurred prior to group assignments, and in the absence of any indication that group interaction would be involved. After individual judgments about the ruling had been made, subjects were told that they would participate in a group task to simulate how judicial bodies such as the Supreme Court reach a collective decision. Group assignments were made by reading off subject identification numbers. Non-unanimous groups contained 4–7 members, so that meaningful majority and minority factions could be constructed. Unanimous groups contained 3–5 members so that they could be compared directly to majorities in non-unanimous groups.

Each group was directed to a private room and its members seated around a table. Subjects were reminded that they would have 10 minutes to reach a decision, and to record this decision on a “group judgment” form. They were advised that only a majority was necessary to reach a final decision, and that the identification numbers of any dissenters should be recorded on the group judgment form. Groups were told that if they finished early, they could knock on the door to signal the experimenter. A timer was set and placed on the table, and the group was left to deliberate. At the end of 10 minutes (or when the experimenter was signaled), the experimenter returned to collect the “group judgment” form.
Group members were then given instructions for completing their “final rationale.” Groups under private communication conditions were instructed as follows:

To help us better understand the effects of group interaction on private thoughts about judicial issues, we would now like you to write a brief explanation of your personal thoughts and feelings about the case, taking into account what was discussed in your group. To do this, imagine that you are a Supreme Court justice and are alone in your chambers, reflecting about a discussion session that has just concluded. If you agree with the majority of group members, describe your private thoughts about why you agree. If you disagree with the majority of group members, describe your private thoughts about why you disagree. Again, we need to know what you think when you don’t have to worry about how other people will react to your views, so please respond with complete candor and honesty, and provide justification for your views. Your responses will be completely confidential. When you are finished writing, place your form in the envelope provided by the experimenter.

Subjects in public communication conditions received identical instructions, except for the following change (adapted from Tetlock, et al, 1989):

. . . imagine that you are a Supreme Court justice and have been asked to prepare this rationale for the public record. If you agree with the majority of group members, write the equivalent of a “majority” opinion, explaining the reasoning behind the majority view. If you disagree with the majority of group members, write the equivalent of a “minority” opinion, explaining the reasons that you believe the majority view is not satisfactory. Remember that your task is to write as convincing a rationale as you can, of a sort that would go into the public record as the best case possible for the view you represent. Please respond honestly, and provide justification for your views. . . .

Content Analyses

Each rationale was scored for integrative complexity by two independent, trained raters who were unaware of the nature of hypotheses and the experimental conditions under which the rationales were generated. Six groups were selected for reliability coding: one from each combination of member status (unanimity, majority and minority) and communication condition (public and private). Interrater agreement (Kendall’s \( W \)) was .85 (\( p < .002 \)). Discrepancies were resolved by an expert rater who was aware of the hypotheses and independent variables but was blind to the condition in which the materials being evaluated were generated.

Integrative complexity. The integrative complexity coding system (Suedfeld et al, 1992) was used to infer levels of differentiation (recognition of multiple dimensions or aspects of an issue) and integration (recognition of conceptual relations among differentiated dimensions). The following illustrations of different integrative complexity levels are paraphrased subject responses.

Score of 1 (no differentiation, no integration). Busing students to an environment that is unfamiliar to them away from their friends and own culture is unfair, no matter what greater purpose it is meant to serve. People should not have to switch schools against their will. The consequences could be worse than staying in an inferior school.

Score of 3 (differentiation, no integration). Busing students out of their own community is a heavy burden for the students to bear. The alternative—lack of equal opportunity—is also unconscionable. I can see why the Supreme Court decided the way they did, but I’m sure the people affected didn’t like the idea.

Score of 5 (differentiation, simple integration). Busing students from deprived school districts into richer ones may be great for the deprived, but it usually brings down the quality
of the better school. Choosing which way to vote requires deciding whether equality or excellence is a more important goal.

Score of 7 (differentiation, complex integration). There are both advantages and disadvantages associated with the busing policy, and they vary depending on whose perspective you take. Busing was a good short-term solution from a political standpoint, but it had harsh consequences for the people affected. In the long view, those sacrifices should be weighed against the social, economic and legal consequences of desegregation.

Scores of 2, 4, and 6 represent transition points between adjacent levels. They are assigned when there is evidence of implicit differentiation (information seeking, qualification to an absolute rule) or implicit integration (hints of recognition of interactions and trade-offs).

RESULTS

The responses of individual members within each group were averaged to provide one set of scores for each of the 20 unanimous groups and two sets of scores (one for majorities, one for minorities) for each of the 20 non-unanimous groups retained for primary analyses. This resulted in a total of 60 data points per dependent variable. Three sets of analyses were performed in which minority vs. majority comparisons were treated as within-group, and comparisons of each of these conditions with unanimous group scores were treated as between-group.

Preliminary Analyses

Prior to statistical analyses, examination of the data revealed that in 18 of the non-unanimous groups, individual members changed their preferences during group discussion, thereby altering the group’s status conditions. The distribution of these groups across cells of the experimental design is displayed in Table 1. Seven groups experienced an increase in majority size and a decrease in minority size due to partial conformity (PC) by some but not all minority members. Another seven groups were initially non-unanimous but became unanimous as a result of total conformity (TC) by all minority members. In four additional groups,
both conformity by minorities plus conversion by majorities (CC) occurred, such that faction membership changed but faction size was not affected.

Data for the 18 changed groups were examined separately for possible differences from included groups. The pre- versus post-task integrative complexity difference scores of majorities and minorities who experienced total conformity, partial conformity and conformity + conversion did not differ significantly from that displayed by majorities and minorities in the groups retained. Since small sample size precluded statistical analyses of the effects of different types of change, and those changes were not central to the theoretical objectives of this study, these groups were excluded from hypothesis tests (see “Supplementary Analyses” for a description of how inclusion of these groups affects overall results).

One hundred eighty nine subjects participated in the 40 groups retained for this purpose. The final sample distribution is shown in Table 2. The size of unanimous groups (M = 3.9) was significantly smaller than the size of non-unanimous groups (M = 5.5; F(1, 24) = 29.87, p < .0001). However, this was planned so that majority size would not be confounded with unanimous and non-unanimous distribution conditions. Consistent with this objective, majorities in unanimous groups were no larger (M = 3.9) than majorities in non-unanimous groups (M = 3.8; F(1, 24) = .15, p > .10). Minority size did not differ across conditions (Fs < 1.0, ns). There were some unintentional size differences in the pro-busing versus anti-busing majority-preference conditions. Group size in the pro-busing condition (M = 5.0) was greater than group size in the anti-busing condition (M = 4.4; F(1, 24) = 4.47, p < .05), because majority size was greater in the pro-busing (M = 4.2) than in the anti-busing condition (M = 3.5; F(1, 24) = 5.20, p < .03).

To insure that none of the random factors (integrative complexity, attitudes toward busing, experience with busing, political activities, knowledge of Supreme Court justices, or group size) fortuitously varied as a function of control variables (sex and majority preference) or experimental manipulations (majority versus minority status and communication condition), two sets of multivariate analyses were performed. First, the data from non-unanimous groups were analyzed as a function of majority and minority status using a 2 (majority preference) × 2 (communication condition) × 2 (sex) × 12 repeated measures (6 random variables × 2 status types) multivariate analysis of variance (MANOVA).

1 Although small sample sizes preclude drawing conclusions from these data, findings show that minorities experienced a decrease in integrative complexity under all conditions (Ms = −.35, −.30 and −.14 in no-change, total-conformity and partial-conformity conditions, respectively) except for the rare condition in which both conformity by minorities and conversion by majorities occurred. In such cases, minorities exhibited an increase in integrative complexity (M = 1.00). The integrative complexity of majority members increased under all conditions (Ms = .23, .38 and .17 in no-change, partial-conformity and conformity + conversion conditions, respectively), except when total conformity occurred. When all minority members conformed, making non-unanimous majorities unanimous, majorities exhibited a decrease in integrative complexity (M = −.11).
Second, for between-group analyses, the responses of unanimous groups were compared with those of majority and minority non-unanimous members separately, using a 2 (majority preference) $\times$ 2 (communication condition) $\times$ 2 (sex) $\times$ 2 (unanimous vs. non-unanimous distribution) $\times$ 6 (repeated measures) MANOVA each time. None of the factors were confounded with the variables of primary concern in the study. It is particularly important to note that subjects assigned to majorities, minorities and unanimous groups did not differ in integrative complexity prior to participating in the group task (all multivariate $F$'s, 1.0, ns). Since preliminary analyses revealed no significant differences between all-male and all-female groups, nor between groups whose majorities favored affirming versus overturning the busing policy, the sex and majority-preference variables were collapsed over for the purpose of hypothesis testing.

**Effects of Distribution, Status, and Communication Conditions**

Data pertaining to differences between majority and minority factions in non-unanimous groups were analyzed using a 2 (communication condition) $\times$ 2 (status) $\times$ 2 (time) MANOVA with one between-group factor (communication condition) and two within-group factors (status and time of assessment: pre-discussion vs. post-discussion). Data pertaining to differences between members of unanimous groups on the one hand, and (a) majority factions in non-unanimous
groups or (b) minority members in non-unanimous groups on the other, were analyzed using a 2 (communication condition) \times 2 (distribution) \times 2 (time) repeated measures multivariate analysis of variance (MANOVA) with two between-group factors (communication condition and distribution) and one within-group factor (time).

Since hypotheses pertain to how participating in the group task changes integrative complexity levels, pre- versus post-group task difference scores are reported unless otherwise indicated. Results bearing on each hypothesis are presented in turn.

**Cognitive-flexibility hypothesis.** After non-unanimous groups participated in the group task, majority members were expected to exhibit an increase in integrative complexity, and minority members were expected to exhibit a decrease in integrative complexity, regardless of the communication conditions under which rationales were generated. Within non-unanimous groups, this pattern corresponds to a two-way (status \times time) interaction. In addition, majority members of non-unanimous groups were expected to exhibit higher integrative complexity than members of unanimous groups. For between-group comparisons, this prediction corresponds to a two-way (distribution \times time) interaction involving majorities in unanimous versus non-unanimous groups.

The data in Table 3 indicate that this pattern was obtained. As expected, participation in the group task led to an increase in integrative complexity among majority members ($M = .23$), and a decrease in complexity among minority members ($M = -.35$) in non-unanimous groups. Members of unanimous groups also exhibited decreased integrative complexity ($M = -.20$). Consistent with predictions, both the time $\times$ status interaction for majority versus minority members within non-unanimous groups ($F(1, 18) = 4.99, p < .04$), and the time $\times$ distribution interaction for majorities in unanimous versus non-unanimous
groups \((F(1, 36) = 4.78, \ p < .04)\), were statistically significant. In addition, comparisons of minorities and unanimous group members revealed a main effect for time \((F(1, 36) = 4.34, \ p < .04)\), indicating that both groups exhibited a decrease in complexity after the group decision. The decreases in complexity experienced by minority and unanimous-group members did not differ \((F < 1.0, \ ns)\). Furthermore, communication conditions did not enter into any significant main or interactive effects in any of the analyses performed \((F’s < 1.0, \ ns)\).

**Communication-strategy hypothesis.** According to this hypothesis, group members who felt accountable for the consequences of the policy adopted by the group (i.e., majority and unanimous group members) were expected to exhibit higher integrative complexity than members who did not feel personally responsible for this outcome. Hence, majority and unanimous group members were expected to communicate with greater integrative complexity than minority members, but only under public communication conditions.

To the extent that these predictions are supported, the MANOVA should reveal a three-way (status \times time \times communication-condition) interaction for comparisons within non-unanimous groups. Between-group comparisons should be characterized by (a) a two-way (time \times communication-condition) interaction involving majorities in unanimous and non-unanimous groups, and (b) a three-way (distribution \times time \times communication-condition) interaction involving unanimous groups and minority members.

These predictions were not supported (see Table 3). Contrary to expectations, majority and unanimous group members did not respond similarly under public communication conditions. Whereas the complexity exhibited by majority members increased \((M = .24)\), the complexity exhibited by unanimous group members decreased \((M = -.11)\) under public communication conditions \((F(1, 18) = 6.38, \ p < .03)\), replicating the pattern observed under private conditions in which communication strategies were not invoked. Furthermore, as noted in the previous section, majorities exhibited increased integrative complexity, and minorities exhibited decreased integrative complexity under private, as well as public communication conditions. Consequently, neither of the predicted interaction effects were obtained because the impact of status and distribution on group members’ publicly communicated integrative complexity levels was statistically indistinguishable from their privately communicated levels. Specifically, integrative complexity increased for majorities under both private \((M = .21)\) and public conditions \((M = .24)\), while it decreased for minorities under both private \((M = -.25)\) and public conditions \((M = -.45; F(1, 18) = .21, p > .10)\). Unanimous group members, who were expected to increase their complexity under public conditions, decreased their complexity in both public \((M = -.11)\) and private communication conditions \((M = -.29)\). Hence the predicted two-way (time \times communication-condition) interaction involving majorities in unanimous and non-unanimous groups was not significant \((F(1, 36) = .25, p > .10)\). Finally, since the integrative complexity of minority members also decreased under private \((M = -.25)\) and public conditions \((M = -.45)\), the predicted three-way
(distribution $\times$ time $\times$ communication-condition) interaction involving unanimous groups and minority members was also non-significant ($F(1, 36) = .47, p > .10$). The communication-strategy hypothesis is not supported by these results because neither of the predicted communication-condition interactions was obtained, and the hypothesis provides no basis for predicting either complexity differences between majority and unanimous group members, or any effects of status on integrative complexity under private communication conditions.

**Additive-effects hypothesis.** If both cognitive-flexibility and communication-strategy effects on integrative complexity occurred, the following pattern of integrative complexity changes was expected. Under private conditions, majority members were expected to exhibit higher integrative complexity than both members of minorities and of unanimous groups. Under public communication conditions, majority and unanimous group members were expected to exhibit greater complexity than minority members, but were not expected to differ from one another in their complexity levels. These predictions would be supported by the following combination of MANOVA effects: (1) for within-non-unanimous group comparisons, a two-way (status $\times$ time) interaction, (2) for between-group comparisons, a pair of three-way (distribution $\times$ time $\times$ communication condition) interactions in which (a) integrative complexity increases for both majorities and unanimous group members under public conditions, but for majorities alone under private communication conditions, and (b) integrative complexity does not increase for either minority or unanimous group members under private conditions but increases under public communication conditions for unanimous group members.

Although majorities exhibited greater complexity ($M = .21$) than minority ($M = .25$) or unanimous group members ($M = .29$) under private communication conditions, the identical pattern was obtained under public communication conditions ($Ms = .24, .45, .11$ for majorities, minorities, and unanimous groups, respectively). Hence, although the a two-way (status $\times$ time) interaction for non-unanimous group members was obtained ($F(1, 18) = 4.99, p < .04$), neither the three-way (distribution $\times$ time $\times$ communication condition) interaction for majority and unanimous group members ($F(1, 36) = .10, p > .10$), nor the three-way (distribution $\times$ time $\times$ communication) interaction for minority and unanimous group members ($F(1, 36) = .47, p > .10$) was statistically significant.

**Supplementary Analyses**

As noted earlier, there were 18 groups in this study in which group members switched majority and minority status conditions, and/or unanimous and non-unanimous group distribution conditions, after group discussion. Because the nature of these changes made the effects of assigned experimental conditions difficult to interpret, and also precluded statistical testing of interaction effects, these groups were excluded from the hypothesis tests reported above. To determine whether and how the results of those tests might be effected by inclusion of
these groups, the effects of status, group distribution and communication on integrative complexity were re-assessed with the 18 changed groups included.

When the changed groups were included, the pattern of means is identical to that obtained without them (see Table 4). That is, majorities exhibited an increase in integrative complexity ($M = .21$), while minorities exhibited a decrease in complexity ($M = -.15$) under both public and private communication conditions ($F$s < 1.0 for all communication-condition effects). However, when the 18 changed groups were included, the results of hypothesis tests were altered in two ways.

First, collapsing over time and communication-condition, minority members exhibited greater integrative complexity ($M = 1.84$) than unanimous group members ($M = 1.54$) when the changed groups were included. This group-distribution main effect ($F(1, 54) = 4.24, p < .04$) was not predicted, but it does not affect hypothesis tests directly. Furthermore, since integrative complexity decreased among minority members of both changed ($M = -.15$) and unchanged groups ($M = -.35$), the results of hypothesis tests comparing minorities and unanimous group members were not altered.

Second, although complexity increased in majorities and decreased in minorities whether the 18 changed groups were included or not, this predicted interaction effect was only marginally significant with the changed groups included ($F(1, 36) = 3.34, p < .07$). When the changed groups were excluded, this interaction effect was significant at the $p < .04$ level. The time × distribution interaction effect for majorities in unanimous and non-unanimous groups remained statistically significant ($F(1, 54) = 5.57, p < .02$), since the increase in complexity exhibited by majorities was virtually unaltered when changed groups were included ($Ms = .23$ and .21 for analyses excluding and including changed

### Table 4

<table>
<thead>
<tr>
<th>Member status</th>
<th>Unanimity</th>
<th>Majority</th>
<th>Minority</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pre Group Task Private</td>
<td>1.78 (n = 10)</td>
<td>1.64 (n = 17)</td>
<td>2.01 (n = 17)</td>
</tr>
<tr>
<td>Public</td>
<td>1.50 (n = 10)</td>
<td>1.49 (n = 21)</td>
<td>1.83 (n = 21)</td>
</tr>
<tr>
<td>$M$</td>
<td>1.64 (n = 20)</td>
<td>1.56 (n = 38)</td>
<td>1.91 (n = 38)</td>
</tr>
<tr>
<td>Post Group Task Private</td>
<td>1.49 (n = 10)</td>
<td>1.78 (n = 17)</td>
<td>1.90 (n = 17)</td>
</tr>
<tr>
<td>Public</td>
<td>1.39 (n = 10)</td>
<td>1.75 (n = 21)</td>
<td>1.64 (n = 21)</td>
</tr>
<tr>
<td>$M$</td>
<td>1.44 (n = 20)</td>
<td>1.76 (n = 38)</td>
<td>1.76 (n = 38)</td>
</tr>
<tr>
<td>Change Private</td>
<td>-.29 (n = 10)</td>
<td>.14 (n = 17)</td>
<td>-.11 (n = 17)</td>
</tr>
<tr>
<td>Public</td>
<td>-.11 (n = 10)</td>
<td>.26 (n = 21)</td>
<td>-.19 (n = 21)</td>
</tr>
<tr>
<td>$M$</td>
<td>-.20 (n = 20)</td>
<td>.21 (n = 38)</td>
<td>-.15 (n = 38)</td>
</tr>
</tbody>
</table>
groups, respectively). There were no other significant differences in the findings of hypothesis tests as a consequence of including these 18 groups.

These findings suggest that the primary difference between changed and unchanged groups lies in the behavior of minority members. Comparison of means in Table 3 and Table 4 shows that minority members who conformed exhibited greater integrative complexity after group interaction (\(M = 1.76\)) than minority members who did not conform (\(M = 1.62\)). Note that prior to status assignments, the integrative complexity of subjects who would be assigned to minority status conditions was not altered by including subjects who would later conform (\(Ms = 1.91\) and 1.97 for samples including and excluding these subjects, respectively).

**DISCUSSION**

The behavior of the freely interacting groups in this study replicates the findings of archival research on the relation of member status to integrative complexity in decision-making groups. As observed previously, majority members exhibited greater integrative complexity than members of minorities (Tetlock et al., 1984; 1985), and members of unanimous groups (Gruenfeld, 1995). After participating in group discussion, subjects assigned to majority factions experienced an increase in integrative complexity, while subjects assigned to either minorities or unanimous groups experienced a decrease in integrative complexity. This occurred under both public and private communication conditions.

This pattern of results calls into question the notion that the effects of member status on integrative complexity are purely strategic. While the difference between majority and minority members is predictable on the basis of accountability to external parties, the difference between majorities in unanimous and non-unanimous groups is not. Furthermore, the increase in complexity experienced by majorities and the decreases experienced by both minorities and unanimous groups were obtained both under public communication conditions, where accountability concerns were emphasized, and under private communication conditions, where they were absent.

These findings can be explained however by the minority influence literature, which suggests that the increase in integrative complexity exhibited by majorities in non-unanimous groups is a consequence of minority influence and its impact on cognitive flexibility. Majority members’ communications should therefore be characterized by an increase in complexity after exposure to a vocal minority, whether those communications are delivered under public or private communication conditions. In contrast, integrative complexity should not increase among unanimous group members, who lack the minority catalyst for either conversion or divergent thinking, nor among minority members, who should experience convergent thinking in response to majority influence. In the experiment reported here, this pattern was obtained under private communication conditions as well as in formal public statements.

The results of this study address two additional questions raised by archival
studies of member status and integrative complexity in policy making groups such as the U.S. Supreme Court (Gruenfeld, 1995; Tetlock, et al., 1985) and the U.S. Congress (Tetlock et al., 1984). In these “real” decision-making groups, member status was chosen by the policy makers who served as subjects. Hence, the integrative complexity levels of majorities, minorities and unanimities might have reflected the characteristics of individuals who chose majority versus minority status, rather than effects of faction membership per se. Subjects in the laboratory experiment reported here were assigned to status conditions using a procedure that controlled for the effects of differences in their preferences, complexity levels, and other personality variables. The same pattern of results was obtained under these conditions, in which status was assigned, as when status was chosen in the “real” world.

Status was confounded with two additional factors in the archival studies mentioned earlier. The effects of both factors were evaluated in the study presented here. Specifically, the finding that majority members exhibited greater complexity than either minority members or unanimous group members was first obtained in a study of the U.S. Supreme Court (Gruenfeld, 1995). This effect could have been due to (a) the inherent complexity of cases on which the Court could not agree, and (b) inherent structural differences in the documents written by majorities and minorities on the Court.

In the present study, members of non-unanimous and unanimous groups in the laboratory experiment all decided the same case (e.g., whether busing should be mandatory for the purposes of racial desegregation). Hence, the potential impact of case content on authors’ complexity levels was eliminated. In addition, group members were given identical instructions about what to include in their rationales, regardless of which faction they represented. Differences that might have been associated with the structural requirements of formal “opinions of the Court” written by majority members, and “dissenting opinions” written by minority members, were thereby also controlled. The results of the present study indicate that the effects of member status on integrative complexity in decision-making groups occur in the absence of these confounding factors.

Implications for Future Research

As noted above, the fact that spontaneous minority influence exerted during free discussion led to increased integrative complexity in majority members is consistent with prior studies of policy making groups where both minority influence and free discussion are natural components of group interaction. It is also consistent with experimental research on divergent thinking, which shows that majorities exhibit increased cognitive flexibility in response to minority influence (Peterson & Nemeth, 1986). Evidence for this effect is copious and has established that it is a robust psychological phenomenon (see Nemeth, 1992, for a review). However, the effects of minority influence on divergent thinking have only rarely been observed in freely interacting laboratory groups (for an exception see Smith, Tindale & Dugoni, 1996). Studies of divergent thinking typically use...
confederate minorities, and often employ nominal groups composed of individuals who work independently, side-by-side, and receive false feedback about one another’s responses (for a review see Nemeth, 1992). Yet the findings obtained here are consistent with those observed in more controlled interactions.

Similarly, the fact that majorities exhibited greater integrative complexity than minorities in this study replicates research on accountability in policy making groups (Tetlock et al., 1984), which shows that accountability to constituents outside group boundaries leads to integrative complexity among majority (rather than minority) members. However, the findings reported here are not consistent with prior lab research on this phenomenon. Laboratory research on how accountability affects integrative complexity typically employs subjects who form judgments as individuals, and anticipate interacting with others but never actually do (for a review see Tetlock, 1991). In this study, group members communicated freely, and were interdependent with regard to their task. Therefore, in addition to whatever inter-group accountability conditions group members faced as a result of experimental manipulations, they also faced intra-group accountability conditions, as they were mutually accountable to one another and to the group itself.

Research on cognitive responses to multiple accountabilities is rare, and its findings are inconclusive (Thomas-Hunt, 1996; Thomas-Hunt & Gruenfeld, 1995). However, members of decision-making groups are generally more attentive to the interests of those parties with whom their relationship ties are strong than they are to the parties from whom they are more psychologically distant (Hogg & Abrams, 1988; Pruitt, 1981; Roby, 1960). This implies that internal accountability among freely interacting group members might reduce the impact of external accountability to hypothetical outsiders with whom subjects never actually interact. To the extent that this occurred here, it might explain why no accountability effects were observed.

It is also possible that the public communication condition in this study induced cognitive processes associated with message transmission to a greater extent than accountability per se. That is, subjects in the public communication condition were asked simply to imagine they had to prepare a rationale for the public record, and to provide the best explanation they could for that purpose. In contrast, most accountability manipulations lead subjects to believe that they will actually have to explain themselves to another person later on (cf., Tetlock, 1983; Tetlock, Skitka & Boettger, 1989). Thus, although subjects in public communication conditions were given “transmission” instructions, they were not really accountable to any outsiders. Rather, groups in both public and private communication groups actually discussed their positions, and were therefore accountable to one another. As noted earlier, this manipulation was designed to replicate findings from a Supreme Court context in which group members are appointed for life and are therefore immune to many types of political accountability. However, it can be argued that it does not provide a strong test of accountability. To the extent that this is true, the absence of public communication condition effects should not be
interpreted as evidence that accountability does not drive integrative complexity in majorities in minorities.

This possibility has interesting implications for future research on accountability, particularly when moving from the individual- to the group-level of analysis. In groups where members interact freely with one another and only imagine or anticipate interacting with outsiders, internal accountability is likely to make collective interests such as group performance, harmony and fairness more salient than individual concerns with external communication conditions. If this were the case, majority members might give more serious consideration to minority interests and become more integratively complex as a result when group interaction actually occurs. On the other hand, in groups for which size or physical dispersion precludes face-to-face interaction, accountability to outsiders might motivate members to maximize individual interests such as dominance, influence and social acceptance. In this case, group members would be less receptive to evidence of alternatives and more receptive to evidence that supports the superiority of their original point of view.

In fact, data from an unpublished study support this possibility. When groups containing majorities and minorities were made externally accountable via the traditional manipulation described above, they were more sensitive to accountability conditions than was the case here; however, this only occurred when group members were prevented from interacting with one another (Gruenfeld, Thomas-Hunt, & Kim, 1996). This finding suggests that accountability to external constituents can also affect the integrative complexity of majority members, particularly when group members don’t discuss their views and are thus more accountable to outsiders than they are to one another. It is also consistent with a wide range of studies demonstrating the impact of communication on group members’ mutual consideration for one another’s interests (for a review see Orbell & Dawes, 1981). Groups that communicate in mixed-motive situations are much more likely to cooperate than groups who do not, because face-to-face communication leads to the development of intra-group trust and commitment (Messick & Brewer, 1983), and to enhanced group solidarity (Kramer & Brewer, 1984). Communication can also increase familiarity in groups, which heightens members’ attentiveness to one another’s unique insights (Gruenfeld, Mannix, Williams & Neale, 1996; Williams, Mannix, Neale & Gruenfeld, 1997). Hence, it is not surprising that groups in the public communication condition were more responsive to intra-group dynamics (e.g., minority influence and divergent thinking) than to inter-group dynamics (e.g., message transmission and accountability). The interactive effects of intra- and inter-group dynamics should be further explored before the absence of public communication condition effects in this study can be clearly interpreted.

These considerations suggest that in order for group members to experience the type of conceptual restructuring associated with increased integrative complexity, they must be motivated to seriously contemplate the alternatives others present. Furthermore, they raise the possibility that the effects of both divergent thinking
and accountability on integrative complexity might depend on the relative importance of group members’ relationships with internal versus external constituents. Future research should examine these possible contingencies and assess the effects of these factors more systematically. Specifically, the accountability conditions under which majority members will be motivated to seriously consider minority viewpoints and adjust their integrative complexity as a result should be more thoroughly investigated.

REFERENCES


