The Effects of Repeated Expressions on Attitude Polarization During Group Discussions

Markus Brauer
Universität Konstanz

Charles M. Judd
University of Colorado

Melissa D. Gliner
University of California, Santa Cruz

Classic explanations of the "group polarization phenomenon" emphasize interpersonal processes such as informational influence and social comparison (Myers & Lamm, 1976). Based on earlier research, we hypothesized that at least part of the polarization observed during group discussion might be due to repeated attitude expression. Two studies provide support for this hypothesis. In Study 1, we manipulated how often each group member talked about an issue and how often he or she heard other group members talk about the issue. We found that repeated expression produced a reliable shift in extremity. A detailed coding of the groups' discussions showed that the effect of repeated expression on attitude polarization was enhanced in groups where the group members repeated each other's arguments and used them in their own line of reasoning. Study 2 tested for this effect experimentally. The results showed that the effect of repeated expression was augmented in groups where subjects were instructed to use each others' arguments compared to groups where instructions were given to avoid such repetitions. Taken together, these studies show that repeated expression accounts for at least part of the attitude polarization observed in the typical studies on group polarization and that this effect is augmented by social interaction, i.e., it occurs particularly in an environment where group members repeat and validate each other's ideas.

The notion of attitude strength has enjoyed considerable interest among social psychologists recently. Petty and Krosnick (in press) argue that attitude strength is a multidimensional concept that expresses itself in multiple ways such as attitude importance, attitude accessibility, and attitude extremity (see also Krosnick, Boninger, Chuang, Berent, & Carnot, 1993). The aspect of attitude strength that is of interest for our purposes is attitude extremity. This construct has been shown to have powerful effects on behavior, memory, and judgment. Extreme attitudes are more consistent with behaviors (Fazio & Zanna, 1978; Petersen & Dutton, 1975) and are more resistant to persuasion than moderate attitudes (Ewing, 1942; Osgood & Tannenbaum, 1955; Sarat & Vidmar, 1976). Individuals with extreme attitudes tend to remember congruent information to a greater extent than less extreme individuals (Roberts, 1984). Finally, extreme attitudes seem to be associated with judgments that a larger proportion of others share one's own point of view (Allison & Messick, 1988; Crano, Gorenflo, & Shackelford, 1988).

There has been a long-standing tradition in social psychology to examine the interpersonal factors that lead to attitude extremity, such as the group polarization phenomenon (Myers & Arenson, 1972; Myers & Lamm, 1976) and polarization due to intergroup conflict (Abelson, in press; Sherif, Harvey, White, Hood, & Sherif, 1961). Group polarization refers to the fact that an individual's attitude toward a given issue tends to polarize during a group discussion with other people who hold a similar opinion on that issue (Myers, 1978; Myers & Lamm, 1976). For example, Moscovici and Zavalloni (1969) observed that French students' initially positive attitudes toward DeGaulle and negative attitudes toward Americans were strengthened through discussion. In a study conducted by Myers and Bishop (1970), a discussion with others having similar racial attitudes increased the gap between high- and low-prejudice groups. Polarization due to intergroup conflict describes the well-known finding that group members' attitudes toward the out-group become more extreme when the two groups are placed in a situation of competition or conflict (Bettelheim & Janowitz, 1949; Levine & Campbell, 1972). For example, in the famous Robbers Cave Experiment (Sherif et al., 1961), the boys' attitudes toward the other group became more extreme when the experi-
menters introduced conflict in the form of a series of athletic events.

Other research on attitude extremity has focused on more cognitive or intrapersonal factors related to attitude polarization. It has been found, for example, that being repeatedly exposed to an attitude object can lead to attitude polarization in the absence of any new stimuli from the environment (Brickman, Redfield, Harrison, & Crandall, 1972; Perlman & Oskamp, 1971). Similarly, Tesser and his colleagues have shown that extended thought devoted to an attitude object leads to a more extreme evaluation of that object (Tesser, 1978; Tesser & Leone, 1977). Our own research has demonstrated that repeated attitude expression also causes attitudes to become more extreme. In a study by Downing, Judd, and Brauer (1992), participants were asked to state their attitudes toward a number of political issues with varying frequency. The results showed a reliable linear trend of frequency such that the more often an issue was responded to, the greater the polarization of participants' attitudes toward this issue during the experiment. As argued elsewhere (Judd & Brauer, in press), it seems as if repeated exposure to the attitude object, extended thought about one's evaluation of the object, and repeated attitude expression may all involve the same cognitive processes (consistent with the explanation originally offered by Tesser, 1978). All three processes cause the individual to focus increasingly on features of the attitude object that are consistent with his or her overall evaluation and to gradually disregard features that are inconsistent with the overall evaluation. As a result, the underlying attribute dimensions become more evaluatively consistent, leading, in turn, to attitude polarization.

Based on our earlier results showing that repeated expression results in polarization (Downing et al., 1992), it seemed plausible that repeated attitude expression might also play a role in the attitude polarization observed in group discussion (Myers & Arenson, 1972). The original studies in this area involved discussion about choice dilemmas (Stoner, 1961), where group members advise an imaginary person who is deciding between two alternatives. In general, one of the alternatives is risky but has a very desirable outcome whereas the other alternative is safe but has only a moderately positive outcome. Stoner (1961) found that individuals were considerably riskier after the group discussion than before. It was Myers and Arenson (1972) who showed that group discussions do not always cause a shift toward the risky alternative but do produce an increase in extremity in the direction of the original inclination. In other words, the phenomenon was not risky shift but rather group polarization. Since then, more than 200 studies have shown in a variety of laboratory and field settings that group discussion polarizes individuals' attitudes toward a given issue as long as all group members have the same original inclination (Brown, 1986; Isenberg, 1986; Myers, 1973; Myers & Lamm, 1976).

Two primary explanations have been suggested for the group polarization effect (Isenberg, 1986; Myers & Lamm, 1976). According to the persuasive arguments explanation, there exists a pool of arguments for each issue, favoring extremes at either end. Each person who considers the issue will have knowledge of a sample of the pool of arguments, which will determine his or her initial attitude. During the group discussion, individual arguments are expressed and become fully shared. Because participants are more likely to express arguments that favor their initial attitude, a large pool of arguments favoring the groups' initial inclination will be shared among all group members. Each individual participant learns new arguments in favor of his or her initial viewpoint and, as a result, attitude polarization occurs (Burnstein & Vinokur, 1977). Support for this interpretation comes from several studies in which participants were exposed to new arguments without knowing the other group members' attitudes (Burnstein & Vinokur, 1973; Vinokur & Burnstein, 1974). Other research has shown that the valence and number of the arguments are good predictors of the size of the mean shift in extremity (Bishop & Myers, 1974).

The second explanation for the group polarization phenomenon is a social comparison or normative explanation. According to this explanation, individual group members polarize when they realize that others share their opinions to a greater extent than they had thought (Myers & Lamm, 1976). Many of us have the desire to be perceived as more favorable than what we perceive to be the average tendency (Fromkin, 1970). As Roger Brown (1974) pointed out, "to be virtuous... is to be different from the mean—in the right direction and to the right degree" (p. 469). When all members of an interacting group engage in the same social comparison process, the result is an average shift in the direction of the predominant attitude. Experimental research has shown that mere exposure to central tendency or to the distribution of responses is sufficient to produce attitude polarization even if no discussion between group members takes place (Baron & Roper, 1976; Myers, 1978).

Both explanations have accumulated at this point abundant supportive evidence and accordingly are generally given credence in the literature. Notice that both explanations, as commonly interpreted, focus on interpersonal processes, that is, they imply that polarization results from what we hear from other group members—their arguments or their normative positions. However, participants not only listen to other people during a typical group discussion; they also state their opinion and are likely to defend it multiple times. According to our earlier results (Downing et al., 1992), repeated attitude expression alone should lead to attitude polarization, independently of the effect due to persuasive arguments from others or due to social comparison processes. This led us to the hypothesis that not all of the attitude polarization observed during a group discussion is due to interpersonal influence, but that at least part of it can be attributed to intrapersonal processes such as repeated attitude expression and thoughts about one's evaluation of the attitude object. We argue that the contribution of these processes has so far been underestimated because the traditional experimental procedure does not allow one to separate the effects of intrapersonal and interpersonal processes on attitude polarization. This is because in typical groups, issues that are discussed involve both hearing from others and speaking to others. If we were to compare participants' extremity on the discussed issue versus an issue that was not discussed, it would be impossible to determine whether the polarization is due to interpersonal processes (hearing arguments and normative positions from others) or to intrapersonal processes (saying one's own position and arguments repeatedly).
We conducted a study in which we unconfounded these two processes. We assessed the effects of hearing other people's point of view and the effects of repeated attitude expression on the extremity of attitudes. Participants met in groups of four and were instructed to discuss five issues that they all generally agreed on. The issues were national political issues such as a nationally funded health care system or reductions in the military budget. To examine the influence of interpersonal and intrapersonal processes on attitude polarization, we independently manipulated the number of times group members stated their own point of view and the number of times they heard other group members state their point of view. To accomplish this, participants in the groups met in dyads throughout the experiment and told the other person in their dyad their opinion toward a given issue. Who said what to whom was determined by a fixed schedule, which was designed so that the number of attitude expressions toward an issue was, on average, independent of the number of times the participant heard someone else talk about this issue. At the end of the experiment, participants indicated their attitudes on all issues. We predicted that both repeated attitude expression and repeated exposure to other people's attitudes would lead to greater extremity on the final attitude ratings.

Study 1

Method

Participants. Participants were undergraduate students at the University of Colorado who participated in partial fulfillment of an introductory psychology course requirement. Because we wanted to form groups of four individuals who all generally agreed on at least five issues, we always scheduled more participants for a session than we actually needed. Based on participants' responses on an initial attitude questionnaire, we selected a group of four participants who participated in the actual experiment. The other participants were dismissed and did not participate in the study. In total, 204 participants came to the laboratory but only 140 participants participated in the study. These 140 participants constituted 35 independent groups of four participants each.

Design. Participants in a group talked about six issues. Of the 10 issues on the initial questionnaire (the issues are identified in Table 1), 6 were selected such that participants had generally similar viewpoints on 5 issues (designated Issues 1 to 5) and dissimilar viewpoints on a sixth issue (designated Issue 6). The sixth issue was included because pretest participants realized very quickly that they generally agreed on all the issues and tended not to take the experiment very seriously. In any group, each participant participated in 15 dyadic encounters, 5 with each of the other three group members. During each encounter, the participant stated his or her opinion toward a given issue to the other group member in the dyad and listened to the other group member who stated his or her opinion toward an issue. Across all participants within a given group, there were thus 60 attitude statements where one person was the speaker and one person the listener.

In addition to issue, two factors were manipulated within each group: the frequency with which attitudes were stated or an issue by a participant and the frequency with which a participant heard another person state his or her attitude on an issue. Frequency of attitude expression varied between 0 and 6, such that participants expressed their own point of view toward a given issue either 0, 1, 2, 4, or 6 times. Likewise, frequency of hearing or exposure varied between 0 and 5. A schedule was designed such that frequency of attitude expression and frequency of hearing other people's opinions were relatively independent of each other across encounters. The exact schedule for all encounters is given in Table 2. This table indicates for each of the 15 encounters which participants were put in each dyad and which issue each participant talked about and heard about from the other participant in the dyad. (The designation of Dyad 1 and Dyad 2 in the Table is arbitrary.)

This schedule of encounters can be summarized in two tables that reflect the two important manipulations: one that lists the number of times each participant stated his or her opinion toward the six issues across the 15 encounters (the top panel of Table 3), and one that lists the number of times each participant heard someone else state his or her opinion toward the six issues across the 15 encounters (the middle panel of Table 3). Note that across participants in a group, issue was unconfounded with frequency of saying and hearing, such that each of the five agreement issues was talked about equally often. This does not mean, however, that across groups issues were talked about equally often. Naturally there were some issues where participants were more often in initial agreement (e.g., inner-city youth) than others (e.g., nuclear power plants). Such issues tended to be included in the set of discussed issues more frequently across groups. (The frequencies with which issues were discussed are also given in Table 1.) But again, the important point is that frequency of expression and frequency of exposure were manipulated within each group and these manipulations were unconfounded with issue and participant.

The third panel in Table 3 presents the number of different people from whom each participant heard an opinion on each issue across the 15 encounters. It is unclear whether social influence—be it normative or informational—predicts polarization as a function of the number of different attitude expressions one hears or the number of different people one hears from. Accordingly we kept track of this latter variable as well.

Our fairly complicated dyadic design was used to ensure that frequency of attitude expression and frequency of hearing other people's viewpoints were relatively independent of each other. This was indeed the case: the correlation between the top panel and the middle panel of Table 3 is .06, calculated across participants and issues (excluding the disagreement Issue 6, which was not used in the analyses). Similarly, the correlation between the top panel and the bottom panel of Table 3
is .04. As expected, the correlation between the second and third panels is fairly high, $r = .66$, because hearing an issue more frequently meant one was likely to hear it from multiple others.

**Procedure.** Between four and six participants were scheduled at any one time. When participants arrived at the laboratory they were asked to fill out a questionnaire where they indicated their attitudes toward 10 different issues (given in Table 1). These ratings were done on 9-point scales with the endpoints labeled *strongly favor* and *strongly oppose*. Participants were asked to wait in an adjacent room while their responses from the questionnaire were entered into a computer. A computer program then generated a group of four participants who all generally agreed on five issues (labeled Issues 1 to 5) and disagreed on a sixth one (Issue 6). Participants were said to agree when their ratings were on the same side of the 9-point rating scale, that is, when all ratings were $\geq 5$ or $\leq 5$. When participants agreed on six or more issues, the computer program listed the five issues containing the fewest number of neutral responses (i.e., ratings of 5). All other participants were dismissed and did not participate in the study.

The remaining four participants were told that our research was concerned with how people discussed political issues. More specifically, we were interested in how people formed impressions of other people's point of views. The experimenter told participants that they would be asked to discuss some of the issues they had just seen on the questionnaire. She explained that one problem with group discussions was that some people always talked more than others. In order to avoid this problem, the discussion in this study would take a somewhat special format. Each of the participants would be paired with one other member of the group and they would have 1 min to exchange their points of view on a

### Table 2

*Encounter Schedule for Study 1*

<table>
<thead>
<tr>
<th>Encounter</th>
<th>Participant</th>
<th>Issue</th>
<th>Participant</th>
<th>Issue</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>A</td>
<td>1</td>
<td>B</td>
<td>3</td>
</tr>
<tr>
<td>2</td>
<td>B</td>
<td>3</td>
<td>C</td>
<td>2</td>
</tr>
<tr>
<td>3</td>
<td>C</td>
<td>2</td>
<td>B</td>
<td>2</td>
</tr>
<tr>
<td>4</td>
<td>D</td>
<td>3</td>
<td>A</td>
<td>2</td>
</tr>
<tr>
<td>5</td>
<td>B</td>
<td>4</td>
<td>D</td>
<td>6</td>
</tr>
<tr>
<td>6</td>
<td>B</td>
<td>3</td>
<td>C</td>
<td>2</td>
</tr>
<tr>
<td>7</td>
<td>D</td>
<td>3</td>
<td>A</td>
<td>5</td>
</tr>
<tr>
<td>8</td>
<td>D</td>
<td>2</td>
<td>A</td>
<td>6</td>
</tr>
<tr>
<td>9</td>
<td>A</td>
<td>3</td>
<td>C</td>
<td>6</td>
</tr>
<tr>
<td>10</td>
<td>B</td>
<td>3</td>
<td>A</td>
<td>1</td>
</tr>
<tr>
<td>11</td>
<td>C</td>
<td>5</td>
<td>B</td>
<td>6</td>
</tr>
<tr>
<td>12</td>
<td>B</td>
<td>4</td>
<td>D</td>
<td>5</td>
</tr>
<tr>
<td>13</td>
<td>A</td>
<td>1</td>
<td>B</td>
<td>6</td>
</tr>
<tr>
<td>14</td>
<td>D</td>
<td>5</td>
<td>A</td>
<td>6</td>
</tr>
<tr>
<td>15</td>
<td>B</td>
<td>4</td>
<td>D</td>
<td>4</td>
</tr>
</tbody>
</table>

### Table 3

*Summary of the Exchanges During the Group Discussion in Study 1*

<table>
<thead>
<tr>
<th>Issues</th>
<th>Participants</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>1</td>
</tr>
<tr>
<td>Number of times each issue was said</td>
<td></td>
</tr>
<tr>
<td>A</td>
<td>6</td>
</tr>
<tr>
<td>B</td>
<td>2</td>
</tr>
<tr>
<td>C</td>
<td>0</td>
</tr>
<tr>
<td>D</td>
<td>2</td>
</tr>
<tr>
<td>Number of times each issue was heard (from 1 or more participants)</td>
<td></td>
</tr>
<tr>
<td>A</td>
<td>2</td>
</tr>
<tr>
<td>B</td>
<td>4</td>
</tr>
<tr>
<td>C</td>
<td>3</td>
</tr>
<tr>
<td>D</td>
<td>1</td>
</tr>
<tr>
<td>Number of people from whom each issue was heard</td>
<td></td>
</tr>
<tr>
<td>A</td>
<td>2</td>
</tr>
<tr>
<td>B</td>
<td>1</td>
</tr>
<tr>
<td>C</td>
<td>3</td>
</tr>
<tr>
<td>D</td>
<td>1</td>
</tr>
</tbody>
</table>
particular issue with the other person. After that, they would be paired with another group member and again they would have a minute to state their opinions, and so on. For each exchange with another person, each participant would receive a paper slip indicating which issue he or she should talk about. The experimenter made it clear that occasionally both partners in a pair would say their opinion about the same issue but that most of the time each partner would talk about a different issue. Each dyadic exchange would take exactly one minute; during the first 30 s the first person would say what he or she thought about the issue on his or her paper slip and during the last 30 s the second person would state his or her opinion toward the issue on his or her slip.

Participants were told that a prearranged schedule would determine who is paired with whom and who talks about which issue. At the beginning of each exchange, the experimenter would give them their paper slip and would send them to one of four locations, called “Location 1,” “Location 2,” “Location 3,” and “Location 4.” The experimenter pointed out that Locations 1 and 2 were in the same room and Locations 3 and 4 were in the adjacent room. Persons in Locations 1 and 3 would always talk first; after 30 s the experimenter would say “stop” and then, the persons in Locations 2 and 4 would have 30 s to state their opinion. Thus, the first two locations defined the first dyad and Locations 3 and 4 defined the second dyad. Across encounters, participants were assigned to locations in such a way that each one spoke first or second in a dyad approximately equally often. It was made clear that the exchanges should be simple one-way communications. That is, the listener should not ask questions or state his or her opinion during the 30 s allocated to the other speaker. Participants were told that they would always have the full 30 s available though they need not use it all. After the exchange, participants would be asked to give back the paper slips to the experimenter who would then give them new paper slips and send them to new locations. This process would continue until they were through the whole schedule. In total, they would meet 15 times with one other member of the group. The experimenter warned participants not to be concerned if they received the same issue more than once, or if they talked to the same person about the same issue more than once. The experimenter said that this also occurred in natural group discussions and that our goal was to replicate this process as closely as possible. Participants were told to simply tell their partner how they felt about the issue at that particular moment.

Participants were asked to put on name tags so that they would get to know each other a little better. The experimenter also informed them that they should look at their paper slip only at the last moment before talking. This was done to ensure that both partners listened to each other instead of preparing their statement in their mind. Finally, the experimenter informed participants that their statements would be taped. After the 15 encounters, participants were asked to fill out a final questionnaire which asked them to indicate one more time their attitude on his or her paper slip and during the last 30 s the second person would state his or her opinion toward the issue on his or her slip.

Results

Our first objective was to test whether our experimental procedure succeeded in inducing group polarization. Because different scales were used for the initial and the final attitude ratings, we could not determine the amount of polarization by directly comparing the pretest versus the posttest ratings of discussed issues. However, it was possible to compare participants' ratings on the discussed issues with their ratings on the issues that were not discussed. There were five discussed issues on which there was initial agreement and on which we expected polarization, and there were four not-discussed issues. We transformed the ratings on the initial and the final questionnaire into extremity scores by taking the absolute value of the difference between the scale midpoint and each of the participant's ratings. We then averaged the extremity scores of the final ratings of all participants toward the five issues that were discussed within a group and compared this value with the average of the extremity scores of the final ratings toward the four issues that were not discussed, controlling for the pretest extremities on the same issues. The analysis involved a repeated measures analysis of covariance (ANCOVA), with discussed versus not-discussed issues as the within-subject (or group) variable. The repeated measures covariate was the pretest average extremities for these same issues. Because participants in any group constitute nonindependent observations, in this analysis and all others we treated the group as the unit of analysis. Accordingly, the two scores on the dependent variable of each group (and on the covariate) are averages computed across both participants and issues.

The mean posttest extremity scores were 6.02 and 4.63 for discussed and nondiscussed issues. The same extremity means, adjusted for the extremities of the pretest ratings, were 5.81 and 4.84. The ANCOVA indicated that these two adjusted mean extremity scores were reliably different from each other, \( F(1, 33) = 25.70, p < .001 \). This indicates that discussed issues were given substantially more extreme posttest attitude ratings than nondiscussed issues, even controlling for initial differences in extremity between the two sets.\(^1\)

Our next and primary objective was to determine whether repeated attitude expression was at least partly responsible for this polarization of attitudes. Because of dependence of observations within groups, the test of our hypotheses involved a hierarchical or multilevel analysis. First, we calculated scores for each of the 35 groups that expressed the extent to which the individual attitudes in a group polarized as a function of the frequency of a participant’s expressing his or her own opinion and as a function of the frequency of a participant’s hearing another’s opinion. These scores estimate the effects of these independent variables at the level of the individual attitude and are unbiased by the group dependence. However, their within-group standard errors are biased because of group-induced nonindependence (Kenny & Judd, 1986). Accordingly, the second level of the analysis treated the group as the unit of analysis (thus treating it as a random variable in a hierarchical design). At this level we tested whether the mean values of these scores were reliably different from zero across groups.

\(^1\) To the extent that there are errors of measurement in the pretest extremity scores, this analysis of covariance underadjusts for the pretest extremity differences between the discussed and undiscussed issues. However, we do not think that this potential underadjustment calls into question the conclusion that polarization occurred. First, because extremity scores were aggregated across both issues and participants within groups, the resulting averages contain substantially less random error than do the individual scores. Second, the adjusted difference in extremity between discussed and undiscussed issues is sufficiently large and reliable that we are confident that it would persist even with totally error-free pretest measures.
The polarization scores, which were calculated in the first step, are simply within-group unstandardized regression coefficients. Two different regression models were estimated in each group. The first regressed posttest attitude extremity scores on frequency of expression and frequency of hearing, controlling for pretest extremity scores. The second regressed posttest extremity scores on frequency of expression and the number of people from whom one heard on the issue, again controlling for pretest extremity scores. These within-group regression coefficients were estimated across the 20 observations (four participants × five issues) within each group. Separate models were calculated for the frequency of hearing and number of people heard from because these variables are highly redundant. These two within-group regressions yielded four regression coefficients for each group that are of interest. First, two coefficients (SAY1 and SAY2) indicate the magnitude of polarization per unit increase in the frequency with which participants expressed their own opinion on an issue. The first (SAY1) is from a model that controls for the frequency of hearing another participant on the issue and the second (SAY2) controls for the number of others heard from on the issue. Additionally, a regression coefficient indicates the magnitude of the polarization difference per unit increase in the frequency with which participants heard someone else express their opinion on an issue (HEAR). The final coefficient (PEOPLE) indicates the increase in polarization due to hearing one more person express his or her opinion on an issue. Both of these latter coefficients were estimated while controlling for the frequency of the participant's own expression. Because pretest extremity scores were controlled in both models, these coefficients portray polarization differences over time associated with each predictor variable.

The means and the standard deviations for these four polarization scores are given in Table 4. Single sample t tests were performed for each to determine whether each was, on average, reliably different from 0 across groups. As predicted, groups polarized as a function of repeated attitude expression, independent of what other variable was in the model; the mean of the SAY polarization scores was .09, t(34) = 2.63, p < .02, with HEAR included in the model, and .09, t(34) = 2.50, p < .02, with PEOPLE included in the model. This makes clear that some of the polarization observed during the group discussion was due to the frequency of attitude expression by a participant. Somewhat surprisingly, groups did not become reliably more extreme as a function of repeated exposure to other people's viewpoints. The mean of the HEAR polarization scores was .05, t(34) = 1.22, n.s. However, the number of different people from whom arguments were heard had a positive effect on attitude extremity. The mean PEOPLE polarization score was .21, t(34) = 2.02, p = .051, supporting the traditional explanations of group polarization, that is, that exposure to other people's viewpoints leads to attitude polarization.

It is interesting to observe that the number of different people from whom statements were heard (PEOPLE) had a greater impact on attitude extremity than the number of times an individual participant heard someone else talk about an issue (HEAR). In other words, if one hears the opinions of three different people, that causes greater attitude polarization than if one hears the same person talking about the issue three times in a row. Also, note that with a p value of .051, the polarization as a function of PEOPLE fell just short of the traditional alpha level of .05. One must realize, however, that we did not have a lot of statistical power for this test. The number of different people from whom each participant heard about an issue only varied between 0 and 3, with all but one value lying between 0 and 2 (see Table 3, bottom panel).

Even though the SAY polarization scores were reliably greater than zero on average, in support of our hypothesis, there was considerable variability from group to group in the magnitude of this effect. Some groups showed a large effect of repeated expression on polarization; others showed a much smaller effect. To understand the effect in more detail, participants' statements were transcribed and coded along a number of dimensions. Because the coding was very detailed (see below) and fairly time consuming, we selected for coding the eight groups that polarized most and the eight groups that polarized least as a function of repeated attitude expression. For the same reasons, only some of the statements from these groups were coded. For each participant, we looked only at the statements made on the issue which that participant talked about six times. We coded all statements made by the participant on that issue and all statements heard by that participant on that issue. For example, Participant A always talked about his or her issue (i.e., the one he or she talked about six times) are referred to as target-speaker statements. Statements in which the target speaker talked about his or her issue were too low, or the tape recorder had been switched off accidentally. As a result, we lost the eight statements from the 16 most extreme groups on the SAY polarization scores from which we had complete recordings.
other group member talk about the target member's issue are called guest-speaker statements.

Participants' statements during the 30-s time period allocated to each encounter were broken down into idea units. Any utterance that contained a new idea was considered a separate unit. Idea units were initially assigned to one of three groups: position statements, arguments, and irrelevant statements. Position statements were idea units where the participant indicated his or her attitude toward the issue ("I really think logging operations in the national forests should be decreased," or "I am sort of neutral on this issue"). Arguments were idea units where the participant provided a reason for her or her attitude or suggested a new way of action ("National forests should be kept for recreational purposes," or "We should recycle more, then we don't have to chop down so many trees"). Irrelevant statements were idea units that were neither a position statement nor an argument ("I really don't know much about this issue," or "I wonder whether this tape recorder really works").

Arguments were broken down further, into the categories different arguments, repeated arguments, and integrated arguments. The goal in this further breakdown was to identify if an argument had been used in a previous encounter in that group or was new. Hence, coding was done in the order statements were made with knowledge of the codes given to previous idea units. A different argument was an argument that had not been mentioned in any encounters previously coded for the group either by the target speaker or by the other participants who talked to him or her about the issue. A repeated argument was an argument that the speaker himself or herself had mentioned before. An integrated argument was an argument that a speaker used and that had been stated previously by a different participant. Two decision criteria were used to decide whether or not an argument was the same as a previous one. According to the strict criterion, an argument was considered repeated (or integrated) only if it contained the identical wording or a very similar wording as a previous argument. According to the lenient criterion, an argument was classified as repeated (or integrated) if it referred to the same idea as a previous argument. For example, if a participant said "gays and lesbians should have the same rights as anybody else" and another participant said later on "regardless of their sexual orientation, equal people should have equal rights," then the second idea unit would be coded as a different argument according to the strict criterion and as an integrated argument according to the lenient criterion. The lenient criterion certainly corresponds more to what we spontaneously would apply if we were asked whether or not two arguments contain the same idea. However, we were interested also in the strict criterion because we wanted to know whether it makes a difference if someone repeated himself or herself word by word or if he or she repeated the same idea using different words. As it turned out, the results involving the strict criterion were similar to those of the lenient criterion, but generally weaker. For this reason, only the analyses of the lenient criterion codes will be reported.

All coding was done by two coders who were blind to the groups' polarization scores. All transcribed statements in all groups were first judged by both coders individually, and then differences between the coders were resolved through discussion. We established the intercoder reliability using the first two groups coded. We simply counted how many decisions the two coders agreed on in doing a complete coding of these two groups. Decisions included judgments concerning where a new idea unit started, which of the categories a given idea unit belonged to, and, if it was a repeated or an integrated argument, what other argument it was identical to. Following extensive training, the two coders agreed on more than 99% of these decisions.

To summarize, each idea unit belonged to one of five categories: position statement, irrelevant statement, different argument, repeated argument, and integrated argument. The total number of idea units in each category was calculated for each group, and these sums were correlated with the groups' SAY polarization scores (actually SAY1). The resulting correlations are shown in Table 5.

Because of the small sample size involved, we present and interpret some of these correlations even when they do not meet the traditional level of statistical significance. First, there was a marginally reliable relationship between the number of idea units and the group's regression coefficient for SAY (r = .44, p < .09). In other words, groups who polarized more as a function of repeated attitude expression simply talked more than groups whose attitudes did not polarize as much. There was also a slight, albeit nonsignificant, tendency for them to generate more arguments, as indicated by the correlation between the SAY polarization scores and the total number of arguments (r = .36, p < .18). However, the number of position statements

<table>
<thead>
<tr>
<th>Content variables</th>
<th>SAY1 r</th>
<th>SAY1 p</th>
<th>PEOPLE r</th>
<th>PEOPLE p</th>
</tr>
</thead>
<tbody>
<tr>
<td>Number of thought units (all speakers)</td>
<td>.44</td>
<td>&lt;.09</td>
<td>.29</td>
<td>ns</td>
</tr>
<tr>
<td>Number of arguments (all speakers)</td>
<td>.36</td>
<td>&lt;.18</td>
<td>.10</td>
<td>ns</td>
</tr>
<tr>
<td>Number of position statements (all speakers)</td>
<td>-.07</td>
<td>ns</td>
<td>.31</td>
<td>ns</td>
</tr>
<tr>
<td>Number of irrelevant statements (all speakers)</td>
<td>.18</td>
<td>ns</td>
<td>.29</td>
<td>ns</td>
</tr>
<tr>
<td>Number of different arguments (all speakers)</td>
<td>.28</td>
<td>ns</td>
<td>.28</td>
<td>ns</td>
</tr>
<tr>
<td>Number of repeated arguments (all speakers)</td>
<td>.35</td>
<td>&lt;.19</td>
<td>.07</td>
<td>ns</td>
</tr>
<tr>
<td>Number of integrated arguments (all speakers)</td>
<td>.62</td>
<td>&lt;.01</td>
<td>.13</td>
<td>ns</td>
</tr>
<tr>
<td>Number of integrated arguments (target speaker only)</td>
<td>.47</td>
<td>&lt;.07</td>
<td>-.18</td>
<td>ns</td>
</tr>
<tr>
<td>Number of integrated arguments (guest speaker only)</td>
<td>.57</td>
<td>&lt;.03</td>
<td>.02</td>
<td>ns</td>
</tr>
</tbody>
</table>

Note. There were 16 groups included in the analysis.
and the number of irrelevant statements were not related to the group's tendency to polarize as a function of repeated attitude expression.

The number of repeated arguments was only weakly related to the groups' tendency to polarize as a function of repeated attitude expression ($r = .35, p < .19$). More impressively, the number of integrated arguments was reliably related to the magnitude of the SAY polarization score ($r = .62, p < .01$). This indicates that the more group members repeated each other's arguments, the more the group tended to polarize as a function of repeated attitude expression. To examine this correlation a bit further, we broke down integrated arguments further into arguments made by a guest speaker that the target speaker subsequently integrated and arguments made by the target speaker that a guest speaker subsequently integrated. The former correlated .47 with SAY polarization; the latter correlated .57. In other words, it seems as if repeated expressions has the biggest effect on attitude extremity when individuals to whom arguments are made repeat them back to the arguer.3

None of these coding categories correlated with the groups' PEOPLE polarization scores, that is, the group's tendency to polarize as a function of the number of different people that each participant heard talking about an issue. This is somewhat surprising. One should not forget, however, that groups were selected for coding to maximize the variability on the SAY polarization scores rather than on their PEOPLE scores. Accordingly, the absence of correlations for PEOPLE polarization probably reflects the fact that these scores were not particularly variable among the coded groups.

The correlation of SAY polarization with argument integration is exceedingly interesting because it implies that attitude expression leads to polarization particularly if the arguments expressed are integrated or repeated by others. Of course, this correlation could well be due to other argument characteristics that are correlated with integration. The most obvious candidate is that integrated arguments are better quality arguments, and thus the observed correlation is really due to argument quality. To examine this possibility, we recoded the attitude statements previously coded, this time giving a subjective rating of argument quality to each. These ratings were done on a 4-point scale, where 1 indicated that the participant provided no reason for his or her viewpoint and 4 indicated that the participant's statement contained a detailed justification of his or her viewpoint, including a number of intelligent arguments that revealed advanced knowledge of the subject matter. Two independent judges coded 60 attitude statements and achieved an interjudge reliability of .81. One of these two judges subsequently completed the subjective quality ratings of all other coded attitude statements. Like the other variables, a summary argument quality measure was computed for each group as the average subjective quality of all coded statements. Perhaps not surprisingly, this subjective variable was highly correlated with the number of arguments coded in our detailed content coding, $r = .93$. More importantly, the correlation between argument integration and SAY polarization remained large and reliable even when subjective argument quality was controlled, $r(13) = .54, p < .05$.

Discussion

Downing, Judd, and Brauer (1992) showed that repeated expressions of attitudes result in greater attitude extremity. Our intention in Study 1 was to determine whether this might account for some of the polarization observed during a group discussion of like-minded individuals. The data suggest that repeated attitude expression indeed constitutes a partial explanation for group polarization. Additionally, and importantly, our data also provide evidence for the role of interpersonal influence in producing group polarization, consistent with abundant prior literature. Interestingly, what seems to matter is the number of different people one hears from on an issue rather than the number of times one hears from others on an issue. This difference could, we think, be reasonably accommodated by either the persuasive arguments or social comparison approaches to group polarization. Accordingly, our data are nondiscriminating about the nature of the interpersonal influence that is at work.

In addition to supporting our hypothesis concerning the role of repeated expression in group polarization, our data also provide unanticipated evidence concerning factors that augment this effect. The coding of the actual attitude expressions in groups that varied in the magnitude of the predicted effect suggests that repeated attitude expression gives rise to attitude polarization especially when those repeated expressions provide arguments that others pick up and repeat in turn. In essence, this puts a distinctly social cast on the repeated expression effect. As a result, the distinction that we made in the introduction between interpersonal and intrapersonal explanations for extremity shifts becomes much fuzzier. One can think of a variety of reasons why repeated expression should be particularly potent in producing polarization when others repeat one's expressed arguments and we provide such theoretical speculation in the General Discussion section below.

But first, we report an additional study on the effect. We had two goals in mind for this second study. First, we wanted to document the effect of repeated expression on group polariza-

---

3 Because we only coded expressions for issues where participants stated their attitudes six times, it might be argued that we should correlate these coded variables not with the overall SAY polarization scores but with a measure of the extent to which participants polarized on just those issues where they expressed their opinions six times. To do this, we needed to measure polarization due to repeated expression on just these issues. Accordingly, within each group we regressed the extremity of the participants' posttest ratings on the extremity of the pretest ratings ($n = 20$) and then averaged the four residuals of the issues that were repeated six times. These four residuals express the extent to which participants polarized more on the issues which they said six times than we would expect them to polarize based on the other issues. This average is just another way to express the amount of polarization as a function of repeatedly stating one's opinion. It is based, however, only on the issues that were repeated six times. These new polarization scores were highly correlated with the overall SAY polarization scores ($r = .87, p < .0001$). Not surprisingly, they correlated in a very similar manner with the coded variables. The correlation with the number of thought units was .52 ($p < .05$), with the number of arguments .43 ($p < .10$), and with the number of integrations .62 ($p < .01$).
tion in a more natural group discussion. In Study 1, participants expressed themselves only in dyads, they were told what issue to discuss when, and they engaged in an exchange of viewpoints rather than a true discussion, because they could not react to each other's statements. This structure was imposed because of our desire to manipulate expression and hearing others' points of view independently. Although our second study placed some restrictions on the group discussion in order to keep these two factors somewhat independent of each other, the group interactions in this second study resembled much more closely typical group discussions. Our independent variables, frequency of repeated expression and frequency of hearing, accordingly, became measured rather than precisely manipulated factors, as explained below.

Beyond showing the robustness of our repeated expression effect in a more natural group discussion, our second goal in Study 2 was to provide experimental evidence for the hypothesis that the effect of repeated expression on attitude polarization is enhanced when participants hear other group members integrate and repeat their own arguments. To accomplish this goal, we formed groups of three individuals who discussed six different issues. One person in each group was given a special role. In half of the groups, this participant was instructed to repeat arguments made by other group members; in the other half of the groups this participant was explicitly told to refrain from repeating the arguments of other group members. The two other participants in each group were given instructions designed to avoid a complete confounding of attitude expression and hearing other's points of view, as explained below. Consistent with the results of Study 1, we expected to find attitude polarization as a function of repeated expression in all groups and, additionally, we expected this effect to be larger in groups in which one participant integrated other group members' arguments.

**Study 2**

**Method**

**Participants.** Participants were undergraduates at the University of Colorado who participated in partial fulfillment of an introductory psychology course requirement. As in Study 1, we formed groups of participants who all generally agreed on five target issues. For this reason, not all of the 214 participants who came to the laboratory actually participated in the study. We formed 46 groups of three participants, using a total of 138 participants.

**Design.** As in Study 1, because of group-induced dependence, the unit of analysis was the group, although the effect of repeated expression was estimated at the level of the individual participant. There were two within-groups independent variables and one between-groups experimental factor. Frequency of expression and frequency of hearing were the within-groups independent variables. Two group members (Participants A and B) were each made responsible for two issues, that is, it was their task to bring up their issues fairly frequently and to state their opinion on them. As a result, for each of the two group members, there were two issues that were likely to be said frequently and heard infrequently, a second set of two issues that were likely to be heard frequently and said infrequently, and a fifth issue that was likely to be said infrequently and heard infrequently. As in Study 1, a sixth issue on which participants disagreed was included to make the discussion more interesting.

The manipulation of issue responsibility by group members A and B was designed to keep frequency of expression and frequency of hearing relatively uncorrelated in these groups. To measure these independent variables, however, we recorded for each participant the frequency with which the participant actually expressed an opinion on each issue. These frequency counts were then converted to frequency of expression and frequency of hearing measures for each participant on each issue. It is these measured independent variables that were used to predict attitude polarization.

**Instruction type** was a between-groups experimental factor. In a randomly determined half of the groups, the third participant (Participant C) received the instruction to integrate others' arguments; in the other groups he or she was told not to integrate others' arguments.

**Procedure.** When participants arrived at the laboratory, they were asked to fill out a short questionnaire on which they indicated their attitudes toward 10 current political issues (same stimuli as in Study 1, see Table 1). The major difference from Study 1 was that participants used a 29-point rating scale for these ratings and not a 9-point rating scale. These data were entered into a computer program that formed groups of three participants (A, B, and C) who all generally agreed on five particular issues (Issues 1 to 5) and disagreed on a sixth (Issue 6), defining agreement as we did in Study 1. All remaining participants were sent home and did not participate in the study.

Participants were told that they were participating in a study on group discussion. They would be asked to discuss six issues with each other, all of which are determined by the experimenter. The discussion should be as similar as possible to a casual discussion with friends. The only restriction was that the experimenter would ask them to change the topic of discussion relatively frequently. Every 2 min, the experimenter would ring a bell and one of the three participants would be asked to state his or her opinion on an issue that was different from the one they were discussing when the bell rang. A fixed schedule determined the order in which the individual participants were asked to change the issue at the ringing of the bell. This schedule was the same in all groups: B, A, C, A, B, A, C, B.4

Participants then received a paper slip with specific instructions. The instructions for the first participant (Participant A) in the integration condition were as follows:

This is a special form of a group discussion. First, you should change the issue of discussion as often as possible. I expect you to change the issue at least once every minute, if possible even more frequently. Second, every group member has assigned roles which he or she should try to fulfill as well as possible:

You are "responsible" for the issues of — — (issue 1), and — — (issue 2). This means that it is your task to bring up these issues as often as possible. You might bring up one of your issues by simply stating your opinion on this issue whenever there is a pause in the group discussion. Another occasion for you to bring up these issues is when it is your turn to change the topic after the bell rings (however, please be aware that you are supposed to change the topic, i.e., if the group talked about one of "your" issues when the bell rang you have to start out with the other one.). I expect you to bring up each of your issues at least 5 to 8 times during the group discussion. Never change the issue when the group is talking about one of "your" issues.

4 We asked participants to change the topic of discussion fairly frequently in order to avoid them talking about the sixth disagreement issue most of the time. Additionally, this procedure allowed participants to bring up their issues without directing too much attention to the fact that they changed the topic.
Also, please try to ignore the issue of (issue 5). This doesn't mean that you are not allowed to say your opinion on this issue, but try to talk about it as little as possible. Never start out with this issue when it is your turn to change the topic after the ringing of the bell.

Please be aware that other group members may have other issues assigned to them or may be responsible for no issue at all. Under no circumstances should you reveal your role to the other group members. Please try to keep the discussion fairly natural. In other words, feel free to react to other group members’ statements even if it is not one of “your” issues. Despite that, make sure that you bring up your issues as often as possible.

Please take some seconds and memorize the three issues mentioned above and what you should do with each one. Try to do your best.

Good luck!

The instructions for the second participant (Participant B) were identical with the only difference being that he or she was made responsible for Issues 3 and 4 instead of Issues 1 and 2. Note that the second participant was also asked to talk as little as possible about Issue 5. The instructions for Participants A and B in the no-integration condition were virtually identical. The only difference was that in the middle of the second to the last paragraph, the following two sentences were added: “Please try to avoid repeating other group members’ arguments. I want to know what YOU have to say, not how well you can repeat other people’s ideas.”

The third participant (Participant C) received instructions which were radically different and depended to a greater extent on the condition the group was in. If the group was in the integration condition then the instructions for the third participant were as follows:

This is a special form of a group discussion. First, you should change the issue of discussion as often as possible. I expect you to change the issue at least once every minute, if possible even more frequently. Second, every group member has assigned roles which he or she should try to fulfill as well as possible:

Your task is to use as much as possible the arguments of the other two group members. You can simply repeat what they said before or rephrase it in your own words. Try to memorize what reasons the other group members used to defend their viewpoints and try to use these reasons in your own statements. To use a fictitious example, if some other group member says that roller blades should be forbidden on campus (1) because roller blades scare pedestrians, and (2) because the Student Health Center is not equipped for treating the kind of accidents that occur with roller blades, then try to memorize these two reasons and try NOT to mention them later on. Try to avoid expressions such as “As Jennifer pointed out . . .”, “I agree with Andy that we should. . . .”, or “I think Stephanie made a really good point when she said. . . .” and so on. Even short exclamations like “Good point!” or “I agree!” should be avoided. If you run out of ideas (which is likely to occur), feel free to repeat your own arguments, i.e., the ones you have said before.

Please be aware that other group members may have other roles assigned to them. You can be sure, however, that the other subjects’ assignments have nothing to do with using or not using the arguments of others. Under no circumstances should you reveal your role to the other group members. Please try to keep the discussion fairly natural. In other words, if it is really unavoidable you can go ahead and use someone else’s argument but please try to do this as little as possible. Try to use your own arguments, i.e., arguments that you alone have said and that were not mentioned by any other group member. It doesn’t matter if they think you are not very responsive because you never react to other people’s ideas.

Participants were seated around a table and were instructed to discuss the six issues during 16 min. They were told that the goal of the discussion was to exchange opinions on the issues, that is, to communicate one’s own opinion to the other group members and to find out where the others stand on the issues. It was made clear to them that they should keep the discussion going during the whole time. Groups who succeeded in doing so would receive a bonus at the end of the study (i.e., a lollipop). Participants’ statements during the discussion were recorded.

The experimenter remained in the same room, rang a bell every 2 min, recorded how often each participant talked about each issue, and noted any abnormalities. At the end of the discussion, participants were asked to fill out a questionnaire where they indicated their own attitudes one more time. They were then debriefed and dismissed.

Results and Discussion

The experimenter noted spontaneously that in two of the groups, participants disagreed considerably with each other on issues where they were supposed to agree. A coder, who was
blind to group number, listened to all 46 recordings and verified that indeed, there was an unusual amount of disagreement in these two groups: the participants strongly disagreed on three out of the five important issues (Issues 1 to 5). In all cases this happened because a participant, who indicated that he or she was neutral on a particular issue on the pretest questionnaire, adopted a position opposite to the other group members when he or she heard them advocating a strong viewpoint. Although these two groups were not the only instances where this happened, in no other group did the group members disagree on more than one issue. Because similar attitudes toward an issue are a prerequisite for group polarization (Myers & Lamm, 1976), we decided to exclude these two groups from the analyses. One of these groups was in the integration condition, the other in the no-integration condition. This reduced the total number of groups to 44.

In order to see whether our between-groups manipulation was effective, we tested whether groups in the integration condition actually integrated more than groups in the no-integration condition. We randomly selected five groups from each condition and transcribed all the recorded statements. Two coders, who were blind to condition, counted the number of integrated arguments in each group. Differences between coders were resolved through discussion. The intercoder reliability was established as in Study 1; the two coders agreed on 86% of the decisions. The mean number of integrations in the five groups in the no-integration condition was 6.00 \( (s = 3.16) \); in the integration condition the mean was 11.00 \( (s = 3.39) \). The difference between the two conditions is reliable, \( t(8) = 2.41, p < .05 \). Thus, looking at the discussions of only 10 groups, there is consistent evidence that participants understood and followed the instructions concerning the integration of other group members’ arguments. Nevertheless, we were surprised by the relatively high number of integrated arguments in the no-integration condition. Despite the fact that we specifically instructed all three participants in these groups not to repeat each others’ arguments, they had on average six integrations. Even though the difference between the two conditions is reliable, we would certainly have hoped to find more variability on this independent variable. It is noteworthy, however, to observe that in a natural group discussion, members have the tendency to use other people’s arguments in their own reasoning, even if instructed not to do so.

Our next goal was to assess the reliability of the experimenter’s recording of how often each participant expressed an opinion on each issue. Recall that the experimenter kept track of this during each group’s discussion and that these values were used to compute the absolute frequency with which each participant expressed him or herself on each issue and the actual frequency with which each participant heard others offer opinions on each issue. These actual frequencies were then used as the measured independent variables in predicting group polarization. In order to test the reliability of the experimenter’s frequency counts, we used once more the 10 groups where we had fully transcribed their discussions. For each of these 10 groups, we coded from the transcriptions the frequency with which each participant expressed an opinion on each of the six issues. We then correlated these frequency counts with the experimenter’s frequency counts that were kept during the actual experimental session. Across groups, the correlation between the two frequency counts was .98. We also calculated the same correlation within each group. The average within-group correlation was .93. We can conclude that the experimenter’s assessment of the frequency with which each participant talked about the issues was quite accurate.

The last manipulation check was to verify that our instructions to Subjects A and B concerning issue responsibility had the desired effect of making the correlation between the frequency of expression and the frequency of exposure to others’ opinions fairly low. Only if these two are relatively unconfounded, as they are unlikely to be in totally unstructured group discussions, can we assess their independent effects on group polarization. The average values for frequency of expression and frequency of exposure for each issue and participant, calculated across groups, are shown in Table 6. Underlined issues in this table are issues for which Participants A and B were responsible. The correlation between these average values, computed across participants and issues, was .10, n.s. We also calculated the correlation between the frequency of expression and the frequency of exposure within each group. The average of the 44 correlations was .08 \( (s = .39) \); the values ranged from -.75 to .76. This shows that our experimental procedure, whereby certain participants were made responsible for certain issues, succeeded in making repeated attitude expression and repeated exposure to others’ viewpoints relatively orthogonal. Deleting groups with very high or very low correlations between these two independent variables did not affect the analyses performed later on, and that is why the results reported below include all 44 groups.

Turning to the main analysis, we first wished to verify overall attitude polarization. Unlike Study 1, participants in Study 2 made their pretest and posttest ratings on the same 29-point rating scale. This allowed us to test directly whether a shift in attitude extremity on the discussed issues occurred during the discussion. All ratings were transformed into extremity scores by calculating the absolute values of the difference between the scale midpoint and each of the participant’s ratings. These scores were then averaged across issues and participants within each group and analyzed as a function of pretest versus posttest (within-groups) and integration condition (between-groups). This mixed-model analysis of variance revealed a reliable pretest–posttest difference, such that posttest ratings were reliably more extreme on average than pretest ratings, Pretest \( M = 8.36 \), Posttest \( M = 8.85, F(1,42) = 6.66, p < .02 \). Neither the condition main effect nor the condition by pretest versus posttest interaction were reliable.

To determine whether participants polarized as a function of repeated attitude expression and of repeated exposure to other group members’ viewpoints, we conducted a multilevel analysis...
as we did in Study 1. First, we performed a regression analysis for each group where we regressed the extremity of the final attitude ratings on the number of times the participant talked about the issue, the number of times he or she heard another group member talk about the issue, and the extremity of the initial attitude ratings. Because three participants talked about five agreement issues, the \( n \) in each regression analysis was 15. These within-group regressions yielded two regression coefficients of interest: The SAY coefficient estimated the difference in polarization per one additional time of attitude expression; the HEAR coefficient estimated the difference in polarization per one additional time of exposure to someone else’s position on an issue. Unlike Study 1, the frequency of expression and exposure predictor variables were measured in each group rather than being manipulated. Additionally, we did not include a predictor that represented the number of people one heard from on an issue because virtually all participants in each group talked about all issues.

Two questions are of interest concerning these coefficients. First, we wanted to know whether each was reliably different on an issue because virtually all participants in each group expressed their attitudes on an issue. Unlike Study 1, the frequency of expression and exposure predictor variables were measured in each group rather than being manipulated. Additionally, we did not include a predictor that represented the number of people one heard from on an issue because virtually all participants in each group talked about all issues.

The second question concerned condition differences in the magnitude of these polarization scores. As can be seen in Table 7, the mean SAY polarization score in the integration condition was .44, which was reliably different from zero, \( t(21) = 3.78, p = .002 \). In the no-integration condition, however, the average SAY polarization score was not reliably different from zero, \( M = .14, t(21) = 1.14, n.s. \). Additionally, these two average coefficients were marginally different from each other, \( F(1,42) = 2.90, p < .10 \). Given the relatively high level of argument integration that occurred in both conditions, and particularly in the no-integration condition where integration took place in spite of our instructions, we take this marginally reliable difference in the magnitude of the effect of repeated expression in the two conditions to be reasonably strong evidence in support of the role of argument integration.

An examination of the residual SAY scores from this between-condition analysis of variance revealed that one of the groups clearly qualified as an outlier. Group 42, in the integration condition, had a SAY polarization score of \(-1.06 \); with group 42 included, the score of group 42 was more than three and a half standard deviations away from the mean score of all the other groups in the integration condition. Additionally, traditional outlier statistics strongly suggested that it qualified as an outlier in the between-condition analysis. The value of its Studentized Deleted Residual was \(-3.02 \) and the value of Cook’s D associated with it was .17.6 We listened to the

<table>
<thead>
<tr>
<th>Participant</th>
<th>Issues 1</th>
<th>Issues 2</th>
<th>Issues 3</th>
<th>Issues 4</th>
<th>Issues 5</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>( M )</td>
<td>( SD )</td>
<td>( M )</td>
<td>( SD )</td>
<td>( M )</td>
</tr>
<tr>
<td>A</td>
<td>4.2</td>
<td>1.4</td>
<td>4.1</td>
<td>1.9</td>
<td>2.5</td>
</tr>
<tr>
<td>B</td>
<td>2.2</td>
<td>1.2</td>
<td>1.8</td>
<td>1.3</td>
<td>4.3</td>
</tr>
<tr>
<td>C</td>
<td>1.9</td>
<td>1.2</td>
<td>2.5</td>
<td>1.4</td>
<td>2.6</td>
</tr>
</tbody>
</table>

Note. Mean values are averaged across groups. Underlined issues are issues for which Participants A and B were responsible.

---

6. Belsley, Kuh, and Welsch (1980) suggested that observations with an RSTUDENT larger than 2 in absolute value need special attention. The suggested cut-off point for COOK’S D is \( 4/pn = .05 \) where \( p \) is the number of parameters in the model (here: \( p = 2 \)), and \( n \) is the number of observations used to fit the model (here: \( n = 44 \)). Group 42 qualifies as an outlier independent of what influence diagnostic is used. The COVRATIO of group 42 is .75 (considered an outlier if \( |COVRATIO-1| \geq 3p/n = .14 \)), its DFFITS is \( -.64 \) (suggested cut-off point: \( 2(p/n)^{3/2} = \pm .43 \)).
exposure to others' expressions. Effects of repeated attitude expression on polarization during integration, it had no impact on polarization resulting from repeated expression. However, there was consistent support that groups in the integration condition polarized more strongly in the integration condition than in the no-integration condition. Although the polarization means are given in Table 7 and now the difference in the magnitude of the SAY polarization scores in the two conditions achieved traditional levels of reliability, $F(1,43) = 3.84, p < .05$. In sum, the detailed coding of discussions from some of the groups in Study 1 suggested an important and unexpected mechanism that seems to augment the polarizing effect of attitude expression in a group setting. Although on average all groups polarized with attitude arguments may matter more than the actual arguments, there was reliably greater polarization when participants heard the opinions of multiple other participants on an issue. The first of these results clearly shows that repeated expression is partially responsible for polarization during a group discussion.

Even in this nonparametric test, however, Group 42 still qualified as a marginal outlier (Studentized Deleted Residual = -2.07). Therefore, we conducted an additional analysis of the unranked SAY polarization scores excluding this group. The resulting condition means are given in Table 7 and now the difference in the magnitude of the SAY polarization scores in the two conditions achieved traditional levels of reliability, $F(1,43) = 3.84, p < .05$. In sum, there was consistent support that groups in the integration condition polarized significantly more as a function of repeated attitude expression than groups in the no-integration condition. In fact, the groups' SAY polarization scores were more than three times greater when Participant C was instructed to integrate other group members' arguments than when he or she was instructed not to do so.

The mean HEAR polarization scores did not differ from zero in either condition nor did they differ from each other. Although the integration instructions affected polarization due to repeated expression, it had no impact on polarization resulting from repeated exposure to others' expressions.

General Discussion

Two different studies were conducted to demonstrate the effects of repeated attitude expression on polarization during group discussions. In the first study we directly manipulated the frequency of attitude expression independently of the frequency of exposure to other participants' points of view. In addition to an overall polarization effect across discussed issues, the results showed that frequent attitude expression led to greater polarization. Additionally, there was reliably greater polarization when participants heard the opinions of multiple other participants on an issue. The first of these results clearly shows that repeated expression is partially responsible for polarization during a group discussion. The second is consistent with previous research on interpersonal processes responsible for group polarization, offering the significant qualification that the number of sources of attitude arguments may matter more than the actual number of attitude arguments one receives from others.

The detailed coding of discussions from some of the groups in Study 1 suggested an important and unexpected mechanism that seems to augment the polarizing effect of attitude expression in a group setting. Although on average all groups polarized with attitude arguments, there was reliably greater polarization when participants heard the opinions of multiple other participants on an issue. The first of these results clearly shows that repeated expression is partially responsible for polarization during a group discussion. The second is consistent with previous research on interpersonal processes responsible for group polarization, offering the significant qualification that the number of sources of attitude arguments may matter more than the actual number of attitude arguments one receives from others.

The detailed coding of discussions from some of the groups in Study 1 suggested an important and unexpected mechanism that seems to augment the polarizing effect of attitude expression in a group setting. Although on average all groups polarized with attitude arguments, there was reliably greater polarization when participants heard the opinions of multiple other participants on an issue. The first of these results clearly shows that repeated expression is partially responsible for polarization during a group discussion. The second is consistent with previous research on interpersonal processes responsible for group polarization, offering the significant qualification that the number of sources of attitude arguments may matter more than the actual number of attitude arguments one receives from others.
Our initial theoretical approach to the effect of attitude expression on group polarization relied on the distinction between interpersonal processes, such as persuasive arguments and normative positions heard from others, and intrapersonal processes such as frequent attitude expression and thought that produces attitude polarization even outside of a group setting (Downing et al., 1992; Tesser, 1978). Downing et al. (1992) clearly showed that repeated expression by itself, outside of the social context in which repeated expression took place in the present studies, has a small but consistent effect on attitude polarization. The present results are consistent with this conclusion, because groups on average in both studies showed polarization due to repeated expression. Admittedly, in the no-integration condition of the second study, the simple effect of repeated expression was not statistically reliable. Nevertheless, its magnitude in this condition is consistent with our earlier conclusion about the role of repeated expression in producing polarization outside of a social context.

That said, however, it is clear from the present studies that the effect of repeated expression on attitude polarization is considerably enhanced by placing it in a social context where group members can integrate repeated arguments into their own arguments. Accordingly, this leads us to reconsider the theoretical distinction we made in the introduction between interpersonal factors responsible for group polarization and intrapersonal factors. Our work has shown that the process of polarization through attitude expression is very much a social process, being enhanced in groups where one hears others integrate one's own arguments. As a result, we believe that the polarizing effects of frequent attitude expression are likely to be particularly potent in most group settings where, we suspect, argument integration and repetition is a very frequent occurrence.

Of course, we have no direct evidence that argument repetition and integration is a frequent occurrence or potent effect in natural groups. Our groups in the first study engaged in rather unusual group discussions. Even in the second study, where an attempt was made to make the discussions more natural, the discussions were highly constrained and regulated by the experimenter. One might therefore wish that the effects of repeated expression on attitude polarization, and the augmentation of those effects through argument integration by others, could be documented in naturally occurring group discussions. Unfortunately, for reasons given earlier, we believe that this would be impossible to do because frequency of argument expression is likely to be very highly correlated with frequency of argument exposure in naturally occurring groups. Groups tend to discuss some issues and not others. And individual group members both state their own positions and hear others' positions on those issues that are discussed. They fail to do both on nondiscussed issues. Because of this confound in naturally occurring group discussions, it was necessary for us to impose some structure in the current studies in order to separate the effects of repeated expression from repeated exposure. For us, that is the nature of the scientific enterprise. In order to demonstrate the effect of a single independent variable, one necessarily isolates it or unconfounds it with the myriad of other variables with which it is correlated in the real world. Admittedly, some loss of generality results. And one struggles to regain that generality by continuing to demonstrate the effect in a less structured situation, as we have done in the second study. But ultimately, the generalization to naturally occurring discussions, where all the contributing factors are highly interwoven, must be done on theoretical rather than empirical grounds.

Although we have consistent evidence that argument integration increases the effect of repeated attitude expression on group polarization, we do not have a firm understanding of exactly why this is the case. A number of explanations seem plausible at this point and future research will be necessary to tease them apart. First, one could argue that it is simply the fact of hearing one's own argument out of someone else's mouth that drives the effect. Hearing it from another person makes the argument more vivid and more accessible in memory. As a result, the argument plays a greater role in the subsequent computation of the attitude toward the issue, and attitude polarization occurs. A second possible explanation is that one feels responsible for an argument once another group member has integrated it into his or her line of reasoning. According to this explanation, an individual participant may feel that it is because of him or her that others hold a particular opinion. Likewise, he or she may be held accountable for that argument if later on in the discussion this argument turns out to be wrong or not relevant. In other words, as soon as another group member repeats one person's arguments that person becomes more committed to it and it becomes more central in his or her representation of the issue. Finally, one may argue that one feels validated when someone else repeats one's arguments. If another person uses one's argument, the individual concludes that it must have been a really good and smart argument. In other words, other group members give feedback on the quality of arguments. As a result, people attach a special value to an argument that seems to have been picked up by others and consider it to be more important when they are asked to state their attitude on the final questionnaire. It is this last explanation that we consider the most plausible. However, all three are viable explanations and future research will be needed to tease them apart.

It is interesting to observe that Myers and Lamm (1976), in their detailed summary on the group polarization phenomenon, talked about the role of cognitive rehearsal and verbal commitment in the polarization process. According to these authors, the presentation of new arguments produces a smaller shift in extremity when it does not involve participation of the group members compared to a situation where participants actively discuss these arguments (Bishop & Myers, 1974). They write: "The subject must actively reformulate the information he has received in order for it to stimulate an internalization of attitude change" (Myers & Lamm, 1976, p. 617). Despite the fact that...
the authors present very little hard evidence on this issue, it is encouraging for us that they recognize the importance of rehearsal. Myers and Lamm (1976) did not assume that the cognitive rehearsal has to be overt and out loud, which makes a direct contrast of the two explanations impossible. It seems likely to us that both processes occur at the same time. Participants hear other people's arguments and rehearse them to themselves, sometimes silently and sometimes out loud, and, at the same time, they repeatedly express their own arguments and realize that other people validate some of their good arguments by integrating them.

This way of looking at our results suggests that they may be seen as a significant extension of the persuasive arguments explanation of group polarization (Burnstein & Vinokur, 1977). At its core, that explanation simply says that polarization results from persuasive arguments. The approach has uniquely concentrated on arguments that one hears from other group members and that one finds to be persuasive. But there is nothing inconsistent to say that one might find one's own arguments particularly persuasive in a group setting because of the feedback one receives about the quality of those arguments. In a group discussion, one throws out arguments for consideration. When others validate them and reinforce them, they become more convincing and attitude polarization ensues.

Although our results might well be fit within an expanded version of persuasive arguments theory, we feel that they represent a significant advancement to our understanding of group polarization. Additionally, we believe that our results point to the very potent impact of others in socially validating one's own ideas, aspirations, and opinions. People convince themselves with the aid of others and the feedback they give. This in large part, we believe, is responsible for group polarization.

References


Received June 13, 1994
Revision received December 9, 1994
Accepted December 19, 1994