Effects of Repeated Expressions on Attitude Extremity

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Fazio has shown that repeated attitude expressions increase the accessibility of the attitude. Increases in accessibility in turn lead to greater attitude–behavior consistency. The present work examines the effects of repeated expressions on attitude extremity. In the 1st study, it is shown that repeated expressions increase extremity when the expressions involve only judgments of attitude valence. In the 2nd study, a similar effect of repeated expressions on extremity is shown when the expressions are given orally, unconstrained by any particular response format. The 3rd study examines a possible mechanism for the effect of repeated expressions on extremity that is based on an associative learning model in which the repeated rehearsal of a response to an object leads to more extreme judgments. The relations between attitude extremity and accessibility and their roles in moderating the attitude–behavior relationship are discussed.

One of the most systematic and persuasive lines of work in the attitude domain in recent years is the research conducted by Fazio and his colleagues. Fazio has identified an attitude as an association between an attitude object and an evaluation, both of which are stored in memory (Fazio, 1986, 1989; Fazio, Chen, McDonel, & Sherman, 1982). One of the central interests of the work conducted by Fazio and his colleagues has been to identify the causes and consequences of the strength of the association between an attitude object and its evaluation. This strength seems to be best measured as the ease with which an evaluation comes to mind when one is confronted by the attitude object (i.e., the attitude's accessibility; Fazio, 1989; Fazio, Sanbonmatsu, Powell, & Kardes, 1986). Fazio has shown that the attitude's accessibility seems to play an important role in determining the extent to which behaviors toward the attitude object are consistent with one's attitude. When the evaluation readily comes to mind in the presence of the attitude object, then behavior is likely to be quite consistent with the evaluation. On the other hand, attitudes that are less accessible tend to play a less important role in guiding behavior (Fazio & Williams, 1986).

In addition to his focus on the consequences of the strength of the object–evaluation link, Fazio has been interested in exploring its causes. Two primary factors seem to affect the strength of the object–evaluation link: direct experience with the attitude object and the frequency with which attitudes have been expressed. Attitudes that are based on direct experience with the attitude object are more predictive of behavior because they are more accessible than other attitudes that have been learned only indirectly (Fazio & Zanna, 1981). Similarly, repeated expressions of attitude responses have been shown to affect attitude accessibility. The clearest demonstration of this effect is a study by Powell and Fazio (1984) in which the frequency with which subjects responded to an attitude inquiry was manipulated within subjects (across issues). This manipulation was shown to have a linear effect on the speed with which a subsequent inquiry about an attitude was answered.

The research that we present in this article was designed to explore a variant on some of the ideas put forward by Fazio concerning the effects of repeated attitude expressions on attitude accessibility. Powell and Fazio (1984) reported that repeated attitude expressions seem to affect only attitude accessibility and not other attitude characteristics. Thus, they report analyses showing no effects on the actual attitude ratings nor on their extremity. The lack of effects on the extremity of attitudes seems somewhat surprising in light of a number of existing results in the literature. First of all, Fazio has consistently found moderate correlations between the accessibility of an attitude and its extremity. Although such correlations do not, of course, argue that they are both measures of the same underlying construct, it seems reasonable to think of both expressed extremity and attitude accessibility as characteristics of attitudes that are more strongly and fervently held. If repeated attitude expressions lead to stronger attitudes, then one might expect effects on expressed extremity as well as on attitude accessibility.

Second, results in the mere-exposure literature (Harrison, 1977; Zajonc, 1968) can be interpreted as consistent with the notion that repeated expression should lead to greater extremity. In general, this literature has shown that repeated exposure to a novel object leads to more positive evaluations. When, however, that object is repeatedly paired with a negative attribute (Perlman & Oskamp, 1971) or when it initially elicits a relatively strong negative evaluation (Brickman, Redfield, Harrison, & Crandall, 1972), then repeated exposure can lead to more nega-
tive subsequent evaluations. Thus, it appears that repeated exposure to an object can lead to more polarized appraisals of objects when those objects elicit initial evaluations or when they have associated attributes that are strongly evaluative. We suspect that in such cases, repeated exposure is likely to be accompanied by repeated implicit expressions of the evaluation of the object. Thus, attitudes may become polarized as a result of simple repeated exposure to the object in cases in which it seems likely that repeated implicit expression accompanies repeated exposure.

A third bit of evidence that leads us to suspect that repeated attitude expressions should affect attitude extremism as well as accessibility comes from the work of Tesser and his colleagues (Tesser, 1978; Tesser & Leone, 1977; Tesser, Martin, & Mendoza, in press), who have shown that extended thought devoted to an attitude object results in attitude polarization. Tesser (1978) has argued that this polarization occurs because thought induces subjects to increase the evaluative consistency of the attributes associated with the object. It seems to us that this may happen simply as a result of the subject's implicit rehearsal or reexpression of their attitude during thought. Of course, we have no direct evidence that subjects engage in reexpression during thought, but it certainly seems reasonable to suspect that they do.

Given that one can make the evidence for the hypothesis that repeated attitude expressions should lead to increased attitude extremism, the question remains why Powell and Fazio (1984) report no such effect. Two reasons for this failure to find the effect seem possible. First, Powell and Fazio simply state that there was no effect on extremity of repeated expressions without revealing the relevant cell means. They conducted separate extremity analyses within each of four sets of issues that they used in their study. Because different subjects were exposed to the same set of issues with varying frequency, the difference in the frequency of repeated expressions in this analysis is a between-subjects difference. When Powell and Fazio reported their primary analysis on latency of responses, they did so collapsing across the entire four sets of issues, thus rendering frequency effects almost invisible. It seems to us to be likely that this second analytic strategy is more powerful one than the first, and it is unclear why extremity effects were analyzed one way and latency effects another.

Second, all attitude expressions were given by Powell and Fazio's (1984) subjects using either 9- or 29-point attitude self-rating scales. Even though subjects responded to a total of 12 issues for which extremity data are available, it seems to us entirely possible that subjects may, on some level, remember from trial to trial both the valence of their previous responses to a particular issue (i.e., did they say they favored or opposed?) and the approximate extremity of those previous responses. Such memories might then lead to responses that are relatively consistent in both their valence and their extremity.

To overcome the first problem, a more powerful analysis is called for. To overcome the second problem, we need to create a situation in which subjects give repeated attitude responses without making salient the extremity of those responses. One way to do this might be to ask subjects only to indicate the valence of their response to each attitude issue or object, using a forced-choice favor/oppose response option. Then, the final time an issue or object is responded to, the response is requested on a full scale that measures both valence and extremity. In such a situation, previous cues about response extremity are not available, and hence repeated expressions might be expected to result in more extreme final responses.

The third study reported by Fazio et al. (1986) used a procedure somewhat like the one we are recommending. In this study, 18 subjects saw 16 attitude objects four times each. For half of the objects, dichotomous attitude responses were given by subjects; for the other half, subjects were asked to respond to a nonattitude question (i.e., Is this a one-syllable word?). Analyzing the data an object at a time, comparing the subsequent extremity of attitude responses between the 9 subjects who answered four prior attitude questions to the object and the 9 subjects who answered four prior nonattitude questions, no consistent extremity differences as a function of type of prior response emerged. Although we think the dichotomous attitude response should facilitate an extremity shift from prior responding, we are not surprised by the reported failure to find such a shift in this study. We simply think that the test of repeated expressions on attitude extremity is unduly weak. First, the comparison involved very few subjects and, second, by testing the difference an object at a time, the comparison fails to benefit from the fact that the attitude versus nonattitude factor is a within-subjects one, once one collapses across objects. In addition, we do not think the attitude versus nonattitude judgment comparison, when those judgments are given with equal frequency, constitutes the most powerful or direct way to test for repeated attitude expressions on subsequent attitude extremity. It would seem better to vary directly the frequency of attitude expressions, as Powell and Fazio (1984) did.

In the research in this article, we examine the effect of repeated attitude expressions on subsequent attitude extremity more directly and powerfully. Our first study is a replication and modification of the Powell and Fazio (1984) study. Subjects were randomly assigned to either a replication condition or a modified replication condition. In the replication condition, subjects gave initial responses with varying frequencies to sets of attitude issues on 9-point scales. They then gave a final paper-and-pencil response to each issue on a 29-point scale. Finally, subjects made forced-choice responses to all issues on the computer, so that we could measure response latencies. The modified replication condition was identical except that the initial responses that were given with varying frequencies to each issue were on forced-choice dichotomous scales. We expected subjects in both conditions to show greater accessibility of attitude responses (i.e., shorter response latencies) as the number of prior responses to an issue increased, replicating the primary results of Powell and Fazio. We also expected subjects in the modified replication condition, in which the prior responses were given on forced-choice dichotomous scales, to show greater extremity of final scalar responses as the number of prior responses to an issue increased.

In the second study, we explored whether extremity differences as a function of the number of prior expressions might be found when those prior expressions are given orally, unconstrained by any particular response format. Such a demonstration would seem to suggest that polarization that is due to repeated expression has considerable generality, because re-
Repeated oral expressions of attitudes seem to characterize most ongoing political and social discussions. On the basis of the results of Studies 1 and 2, in the third study we attempted to explicate a possible process model that may be responsible for the effect of repeated expressions on expressed extremity.

**Study 1**

**Method**

Subjects. Subjects were 150 undergraduates at the University of Colorado, who participated in partial fulfillment of an introductory psychology course requirement. They participated in groups of 1 to 4 while seated at individual tables in the experimental area. We randomly assigned half of the subjects to the replication condition and half to the modified replication condition.

Procedure. Similar to the procedure used by Powell and Fazio (1984), 15 current attitude issues were chosen for use in this study. The 15 issues were randomly divided into five sets of 3 issues. These are shown in Table 1. Throughout the course of the experiment, subjects expressed their attitudes toward the issues in a particular set zero, one, two, four, or six times in a within-subjects design. Across subjects, sets of issues were counterbalanced with frequency of expression through the use of a Latin Square design.

As in the Powell and Fazio (1984) study, all subjects completed two separate attitude questionnaires. For each subject, one set of issues did not appear in either of the questionnaires (zero-expressions set). An additional set did not appear in the first questionnaire and appeared once in the second questionnaire (one-expression set). For each subject, a third set appeared once in the first questionnaire and once in the second questionnaire (two-expressions set). A fourth set of issues appeared three times in the first questionnaire and once in the second questionnaire (four-expressions set). A fifth and final set appeared five times in the first questionnaire and once in the second questionnaire (six-expressions set).

The primary manipulation between subjects concerned the form of the first questionnaire. For subjects in the replication condition, each item in the first questionnaire listed an attitude issue followed by a 9-point bipolar scale labeled at the endpoints (e.g., harmful-beneficial, bad-good, dislike-like, disapprove-approve, and disadvantageous-advantageous). Each time an issue was shown, different scale endpoints were used. Subjects were instructed to circle the scale value that best represented their attitude on the issue. For subjects in the modified replication condition, each item in the first questionnaire again listed an attitude issue, followed, in this case, only by the two adjectives used to describe the scale endpoints. As in the 9-point condition, different scale endpoints were used each time an issue was shown. In this condition, subjects were simply instructed to circle the adjective that most aptly described their attitude toward the issue. Again, for each subject, five of the sets of issues, two did not appear at all on the first questionnaire. The first questionnaire contained one item relating to each of the three issues in another set, three items relating to each of the three issues in another set, and five items relating to each of the three issues in the final available set. The issues of interest, as well as several filler items, were randomly assigned to their positions on the questionnaire.

The second questionnaire was slightly different from the first questionnaire and did not vary as a function of the between-subjects manipulation. On this questionnaire, all subjects were asked to indicate to what extent they opposed or supported each issue on a 9-point bipolar scale (except those issues in the zero-expressions set). Each issue appeared once on this questionnaire, and the scale endpoints (oppose/support) remained constant across issues. Again, issues and several filler items were randomly assigned to questionnaire positions. In summary, after completing both of the questionnaires, a subject had responded to each set of issues zero, one, two, four, or six times.

After completing the two questionnaires, subjects started on the computer phase of the experiment. During this phase, all subjects were shown twice each of the 15 issues on the computer screen. On any one trial, an issue appeared on the screen, followed by one of two evaluative queries ("Good?" or "Bad?"). Subjects were instructed to press either a yes or a no button in response to each query as quickly and accurately as they could to indicate whether or not the adjective query was descriptive of their attitude toward the issue. Responses and latencies were recorded.

Six different filler items appeared initially to familiarize subjects with the task. Following these items, two blocks of 15 trials each were shown to the subjects, with each issue appearing once in each block. One of the times each issue appeared it was followed by the query "Bad?" and the other time by the query "Good?". Within each of the presentation blocks, issue order was randomized, and which query was asked for each issue was also randomly determined. No time interval separated the two blocks of trials.

Two primary dependent variables were analyzed. To examine the development of attitude accessibility as a function of repeated expressions, the response latencies on the computer queries were examined as a function of the number of prior responses to the attitude issue on the two previous questionnaires and the between-subjects manipulation of the form of Questionnaire 1. To enable us to examine attitude extremity, the responses to each issue on the second questionnaire (given on 29-point rating scales) were transformed into extremity scores (i.e., absolute deviations from the scale midpoint). These were also analyzed as a function of the number of prior responses to the issue on the first questionnaire and the between-subject manipulation of the form of Questionnaire 1.

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1 This procedure involved a slight variation on the procedure used by Powell and Fazio (1984). Because we wished to unconfound time spent reading the stimulus item from response time, the adjective query was presented to the subject 0.5 s after the presentation of the issue, and the timing of response latencies did not begin until the presentation of the adjective query. As a result, the mean response latencies we observed are considerably shorter than those reported by Powell and Fazio.
Results

Replication of response accessibility results. We first present the analysis of the response latency data to determine whether our study replicates the primary results of Powell and Fazio (1984). For each set of issues, log-transformed response latencies were averaged for each subject. These set averages were then analyzed as a function of the number of prior questionnaire responses, whether the response was given on the first block from the computer phase or on the second, and the between-subjects manipulation of the form of Questionnaire 1. Table 2 presents the relevant cell means; we have applied an inverse transformation to the mean log latencies to return them to the latency metric.

Replicating the primary results from Powell and Fazio (1984), the analysis revealed a significant linear trend in response latencies as a function of the number of previous responses, $F(1,148)=4.08$, $p<.05$. Simple analyses within blocks showed that this increase in accessibility as a function of the number of previous responses was reliably high on the first block of computer responses, $F(1,148)=7.45$, $p<.01$, but it was not found for the second block of responses. Again, this pattern of results replicates those of Powell and Fazio (1984). Unlike Powell and Fazio's results, however, the quadratic trend in the response latencies as a function of number of prior responses was not reliable. They reported that most of the increase in accessibility as a function of prior responses was due to the difference between the issues in the zero-expressions set and those in the one-expression set. This appears not to be the case in the present data. The between-subjects manipulation of the form of Questionnaire 1 did not affect the magnitude of the linear trend in latencies that was due to the number of prior responses, $F(1,148)=0.74$, $p>.5$; although there was an overall indication that subjects who received the dichotomous form of Questionnaire 1 showed somewhat faster response latencies than those who received the 9-point form of Questionnaire 1, $F(1,148)=2.60$, $p=.11$.

In summary, then, these results largely replicate the accessibility results of Powell and Fazio (1984). In addition, they demonstrate that our manipulation of the form of Questionnaire 1 did not affect the extent to which prior responses influenced an attitude's accessibility.

Extremity of Questionnaire 2 responses. The major hypothesis motivating this research was that the number of prior responses given to a set of attitude items should affect response extremity in addition to response accessibility, particularly in the modified replication condition in which Questionnaire 1 responses were dichotomous choices. Extremity scores (i.e., deviation scores from the scale midpoint) from the second questionnaire were analyzed as a function of the number of prior responses on Questionnaire 1 and the between-subjects manipulation. The resulting mean extremity scores are presented in Figure 1.

Overall, the linear trend in extremity scores as a function of the number of prior responses was not reliable, $F(1,148)=2.43$, $p=.12$. The interaction between the linear trend and the form of Questionnaire 1 was marginally reliable, $F(1,148)=3.07$, $p=.08$. As the means show, it appears that responses to issues became more extreme as a function of the number of prior responses to those issues when those prior responses were dichotomous. In the replication condition, in which Questionnaire 1 responses were given on 9-point scales, no linear trend in extremity is apparent. Simple effects tests confirm these conclusions. In the dichotomous condition, the linear trend in extremity is quite reliable, $F(1,74)=5.62$, $p=.02$; whereas in the 9-point replication condition, there is no evidence of a linear trend as a function of the number of prior responses, $F(1,74)=.02$, ns. It thus appears that the number of previous responses does affect the subsequent extremity of an expressed attitude, but only in the condition in which the prior responses involve a judgment of valence only rather than valence plus extremity. When Questionnaire 1 ratings are made on 9-point scales, as in the original Powell and Fazio (1984) study and our replication condition, it appears that prior indications of extremity inhibit extremity shifts.

Additional analyses. Additional analyses addressed two remaining issues of interest: the relationship between attitude accessibility and attitude extremity, and the role of consistency of response valence in the results we have reported.

To examine the relationship between attitude accessibility and attitude extremity, we computed, for each issue, the correlation between subjects' latencies on the first computer trial and the extremity of their ratings on the second questionnaire. The resulting average correlation (averaging Fisher Z-transformed correlations across issues) equaled $-0.16$. Although this relationship is not as large as those typically reported by Fazio, it does appear to be the case that more extreme responses are given to more accessible attitudes. More interesting, we found that the linear trend in attitude accessibility and the linear trend in attitude extremity, both as a function of the number of prior responses to an attitude item, were also reliably related ($r=-.22$, $p=.005$). Thus, subjects who tended to show the largest speedup in attitude responses as a function of prior responses also showed the largest extremity shifts as a function of the number of prior responses. Somewhat surprisingly, however, this relationship between the two linear trends did not depend on the between-subjects manipulation; it was found in both conditions.

Finally, we examined whether the consistency of the prior responses, defining consistency only in terms of response valence, moderated the effects previously reported. We expected that increased accessibility and extremity of response would occur as a function of the number of previous responses only if...
those previous responses had shown a relatively high level of valence consistency. If a subject switched back and forth from trial to trial in whether they favored or opposed an issue, then prior responding might be expected to have a smaller effect. Overall, valence consistency was remarkably high. On average, 94% of the responses to an item showed the majority valence of other responses by a subject to that same item. Given this high average level of valence consistency, we were not surprised to learn that consistency did not in fact moderate the previous findings on either the attitude-accessibility or the attitude-extremity dependent variables.

Discussion

Our results indicate that previous responses to an attitude question have effects on the accessibility of the attitude, replicating Powell and Fazio's (1984) results, and on the rated extremity of the attitude. These latter effects, however, appear to be dependent on the form of the previous responses to the attitude item. When previous responses involve scalar judgments, indicating both the valence and extremity of one's attitude, and when those previous responses immediately precede the final judgments whose extremity is of interest, then no effect of prior responding on rated extremity emerges. On the other hand, when the previous responses involve only the indication of response valence, then an extremity effect of prior responding is apparent. These results seem to suggest that the failure to find an extremity shift that is due to repeated expressions in both the Powell and Fazio (1984) study and our replication condition somehow results from subjects retaining in memory information about the approximate extremity of previous ratings. Although we have no direct evidence that such memory effects are responsible for the failure to find extremity differences as a function of previous responding in the condition involving scalar judgments, we think this is the most likely explanation.

An alternative explanation for the difference between our two conditions in the effects of prior responding on attitude extremity exists. Neutral responses to the issues in this study were possible on the first questionnaire only for subjects in the replication condition in which judgments were given on a 9-point scale. In the other condition, in which only two responses were possible, subjects who were truly neutral on the issue were forced to choose one alternative valence or the other. It is possible that the forced-choice nature of this task made truly neutral subjects decide on a valence that they would not have chosen otherwise and that subsequent responses by these subjects, even on the second questionnaire in which true neutrality was possible for all subjects, remained consistent with this chosen va-
ience. This suggests that the effect of repeated responding on attitude extremity is simply an artifact of the forced-choice nature of the response format and that frequency of response in general does not induce greater extremity.

To argue against this alternative explanation for our results, we conducted a second study in which initial responses to the attitude issues were given orally, unconstrained by any particular response format. Rather than providing each subject with a first questionnaire on which the various issues were responded to with varying frequency, we simply presented the issues on a computer screen for a short, fixed duration and asked subjects to tell us how they felt about each issue. Again, sets of issues varied in the frequency of their presentation. Because response language is unrestricted in this format and because subjects were explicitly told that neutral responses were perfectly acceptable (see exact experimental instructions in the Method section), it seems that any polarization effect induced by the frequency of attitude expression cannot be attributed to the alternative explanation that our forced-choice instructions imposed a valence decision when subjects were truly neutral on an issue.

In addition to allowing us to argue against the alternative explanation for the extremity effects in the forced-choice condition of the first study, we wished to replicate those results in an oral repetitive-expression condition to increase the generalizability of our basic results. It seems to us that there are many situations in which people are called on to repeatedly state their positions on various social and political issues, unconstrained by any particular response language. Such situations arise in political debates, social and political action groups, everyday discussions with friends, and many other social forums. If polarization results from frequent oral expression, then we have increased confidence that the effect is one that extends well beyond the confines of the experimental laboratory.

Study 2

Method

Subjects. Subjects were 61 undergraduates at the University of Colorado, who participated in partial fulfillment of an introductory psychology course requirement. They participated in the study individually.

Procedure. All subjects participated in a single experimental condition in which they orally responded to issues that appeared with varying frequencies on a computer screen. Their oral responses were recorded and subsequently coded in ways that we describe at a later point. Following these oral responses, subjects completed the questionnaire that was referred to as the second questionnaire in Study 1. On this questionnaire, they responded to each issue (all except one set of issues) a single time on a 29-point bipolar scale, with endpoints labeled oppose/support. The three initial items that appeared on the screen were filler items to familiarize subjects with the task. Subsequent to these initial items, issues from three of the sets were presented in a random order. Issues from one set were presented a single time; those from a second set were presented three times during the sequence; and issues from the third set were presented a total of five times. In addition, one of the initial filler items appeared subsequently two more times during the sequence, and another initial filler item was presented an additional four times. Sets of issues were randomly assigned to varying frequency of appearance in this phase of the study. (Two sets did not appear; one set appeared once; one set, three times; and one set, five times). Each issue appeared on the screen for 9 s, with an interstimulus delay of 2 s. All oral responses were recorded and subsequently coded by two independent judges who were blind to frequency of exposure.

The three initial items that appeared on the screen were filler items to familiarize subjects with the task. Subsequent to these initial items, issues from three of the sets were presented in a random order. Issues from one set were presented a single time; those from a second set were presented three times during the sequence; and issues from the third set were presented a total of five times. In addition, one of the initial filler items appeared subsequently two more times during the sequence, and another initial filler item was presented an additional four times. Sets of issues were randomly assigned to varying frequency of appearance in this phase of the study. (Two sets did not appear; one set appeared once; one set, three times; and one set, five times). Each issue appeared on the screen for 9 s, with an interstimulus delay of 2 s. All oral responses were recorded and subsequently coded by two independent judges who were blind to frequency of exposure.

Although judges were not told the issue that evoked the response they were judging, the frequency of prior exposures to that issue, or the number of prior responses that had been given to all issues, there were occasional cues that indicated that an issue had been previously responded to. Thus, for instance, in a few cases, the subject would say something to the effect of "As I already said..." Because judges saw such comments when they occurred, we should qualify the claim that they were truly blind to frequency of exposure. Accordingly, the results for frequency effects on judgments of these comments should be interpreted cautiously.

The three initial items that appeared on the screen were filler items to familiarize subjects with the task. Subsequent to these initial items, issues from three of the sets were presented in a random order. Issues from one set were presented a single time; those from a second set were presented three times during the sequence; and issues from the third set were presented a total of five times. In addition, one of the initial filler items appeared subsequently two more times during the sequence, and another initial filler item was presented an additional four times. Sets of issues were randomly assigned to varying frequency of appearance in this phase of the study. (Two sets did not appear; one set appeared once; one set, three times; and one set, five times). Each issue appeared on the screen for 9 s, with an interstimulus delay of 2 s. All oral responses were recorded and subsequently coded by two independent judges who were blind to frequency of exposure.

The second and third phases of the study were identical to those of Study 1. During the second phase, subjects filled out a questionnaire on which each issue from four of the sets was judged a single time. The four sets included the three that were responded to orally during Phase 1 and one of the two remaining sets of issues. Judgments were given on 29-point scales with endpoints labeled oppose/support. In summary, these judgments were given to issues seen previously zero times, one time, three times, or five times. As in Study 1, issues occurred in a random order in this questionnaire, and some filler items were also included.

During the final phase of the study, subjects were shown each of the 15 issues twice on a computer screen. On any one trial, an issue appeared on the screen followed by one of two evaluative queries ("Good?" or "Bad?"). Subjects responded to each query by pressing...
either a yes or no button. Responses and response latencies were recorded. Six filler items initially appeared, followed by two blocks of the 15 issues, with issues arranged in a random order within blocks. Which query was paired with any issue on the first block was also randomly determined; the complement query was always presented during the second block.

Results

Log-transformed latencies from the third phase of the study were analyzed as a function of the number of prior responses to the issue (zero times, one time, two times, four times, or six times) and presentation block. Table 3 presents the relevant means, applying an inverse transformation to the mean log latencies to return them to the latency metric.

The analysis revealed a significant interaction of the Linear Component of Frequency X Block, $F(1, 60) = 7.26; p < .01$. Simple effects tests of the linear trend in latencies that was due to frequency within each block showed that the linear trend was reliable in the case of the first block of judgments, $F(1, 60) = 5.62, p = .02$; but did not approach reliability in the second block of judgments, $F(1, 60) = 0.85, ns$. These results replicate those of the first study and of Powell and Fazio (1984): Frequency of prior responding made attitude responses more accessible on the first block of trials. As in our first study, but not as in the Powell and Fazio (1984) study, the quadratic trend in the first block of judgments as a function of frequency was not reliable.

The questionnaire responses from the second phase of the study were converted to extremity scores (i.e., absolute deviations from the scale midpoint) and analyzed as a function of the frequency of prior exposure to the set of attitude issues, averaging over the issues within a set, in a manner parallel to the analysis of Study 1 questionnaire data. The resulting mean extremity scores are presented in the top half of Table 4. The analysis revealed a reliable linear trend in extremity scores as a function of frequency, $F(1, 59) = 6.32, p = .015$. Neither the quadratic nor cubic trend components of frequency approached statistical significance. Thus, replicating the results from the dichotomous condition of Study 1, it appears that more frequent prior responses to an attitude issue leads to more extreme attitude ratings even when those prior responses are given orally, unconstrained by any particular scale language.

We examined whether the oral responses to the issues, given during the first phase of the study, became more extreme as the issue was responded to repeatedly. Recall that these oral responses were coded by two judges for the attitude expressed. These 9-point ratings were converted to extremity scores and analyzed as a function of the prior frequency with which an oral response had been given to that particular issue, with frequency values varying from 0 to 4. (For frequency value 0, i.e., no prior oral responses to the issue, responses to nine different issues were averaged for each subject. These nine issues were from the three sets seen only once, three times, or five times during this initial phase of the study. For frequency values 1 and 2, responses to six different issues were averaged; for frequency values 3 and 4, responses to three different issues were averaged.) The resulting mean judged extremity scores are given in the lower half of Table 4. The analysis of these scores revealed a marginally reliable linear trend for frequency, $F(1, 59) = 3.67, p = .06$. Thus, not only did subjects' questionnaire ratings become more extreme as a function of the number of prior responses, but there is evidence that their oral responses became more extreme as well. Finally, there was a parallel linear trend for frequency on the degree to which the oral responses were judged to be elaborated or justified by the subject, $F(1, 59) = 3.19, p = .08$, with less elaborate responses given to issues that had been previously responded to more often. Not surprisingly, this linear trend in judged elaboration was related to the linear trend in the judged extremity of oral responses, $r(59) = .23, p = .06$.

Although issues were unconfounded with frequency across subjects, within any subject, issues and frequency were confounded. To the extent that there were large differences between issues in the extremity of initial attitudes expressed, error variation in the test of the frequency effect was introduced, and power was reduced. Because we have judgments of the extremity of the first oral response given to all issues seen once, three times, or five times during the initial phase of the study, it is possible to examine the effect of frequency on questionnaire extremity from Phase 2 for these issues, partialing out issue differences in initial oral response extremity. To do this, we regressed Phase 2 questionnaire extremity on the extremity of the initial oral response, with the regression being computed across subjects and issues. The residuals from this regression were then averaged within subjects at different values of fre-

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Table 3
Mean Response Latencies: Study 2

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<tr>
<td>1</td>
<td>1.47</td>
</tr>
<tr>
<td>2</td>
<td>1.45</td>
</tr>
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</table>

Note: Response latencies are given in seconds.
frequency. All included issues had necessarily been seen at least once during the oral phase of the study. These residuals were then analyzed as a function of frequency. The resulting linear trend in residualized questionnaire extremity scores was highly reliable, $F(1, 58) = 9.87, p = .003$. Thus, the polarization induced by repeated expression was highly reliable once we controlled for the variation between issues in the extremity of the initially expressed attitudes.

Finally, as in Study 1, we examined the relationship between attitude accessibility and attitude extremity. Averaging across issues, the simple relationship between the two variables was $−.23$, a value somewhat higher than that found in Study 1. As in Study 1, there was a reliable relationship between the linear trend in the effect of frequency on accessibility and the linear trend in the effect of frequency on extremity, $r(59) = −.36, p = .004$. Thus, those subjects who tended to show more strongly the effects of prior attitude responses on accessibility were also those who tended to show greater extremity shifts as a function of the frequency of prior responses.

Discussion

The replication of the polarization induced by repeated expression in this second study is important for two related reasons. First, it effectively suggests that the Study 1 results in the forced-choice condition are not due to an artifact of the repeated use of a particular response language. Second, it increases the generalizability of the effect considerably, because oral expressions of attitudes are certainly the most frequent form of expression and because our research demonstrates that polarization occurs as a function of frequency both in the oral expressions themselves and in subsequently generated responses to attitude questionnaires.

Of course, the demonstration of the polarization induced by repeated expressions in these two studies does little to clarify the process underlying the effect. It is obviously important to develop an explanation for the effect, in addition to simply determining its generalizability. Two explanations seem possible at this point, and our purpose in the third study was to lend credence to one of these.

One explanation is based on the presumption that the primary effect of repeated expression is on attitude accessibility and that, to the extent that accessibility and extremity are discriminative constructs, increases in attitude accessibility in turn are responsible for greater expressed extremity. Attitude responses are constructions that are affected both by internal cues about the valence and intensity of the attitudes and by external cues concerning how response scales are to be understood and interpreted (Judd & Brauer, in press). Both the internal and external cues may vary in their strength or diagnosticity for the attitude judgment called for. Consider a judgment that asks not only for the valence of one's attitude but also for its intensity or extremity. Although we would suggest that subjects have direct access to internal cues of attitude intensity, those cues generally do not translate directly and unambiguously onto any particular response scale unless that response scale has been repeatedly practiced. Accordingly, it seems reasonable that subjects may use other uncertain cues, internal or external, in guiding their expressed extremity. A very reasonable internal cue is the case with which the attitude comes to mind, which in turn is affected by the frequency of prior expressions of the attitude. Thus, we are suggesting that subjects may partially infer the extremity of an attitude judgment they are about to make by the availability of the attitude in memory. Because attitudes that have been previously expressed more frequently are more accessible, they should be judged to be more extreme so long as the particular judgmental language has not previously been extensively practiced.

Although this argument seems to make theoretical sense, there is some evidence in the data of our first two studies that suggests it is insufficient. If accessibility mediates the relationship between frequency of expression and expressed extremity, then the effects of frequency on extremity should disappear when response latency is controlled. On the other hand, the effects of frequency on response latency should not disappear when expressed extremity is controlled. We conducted the appropriate repeated measures analyses of covariance (Judd & McClelland, 1989) using the data both from the forced-choice condition of Study 1 and from Study 2. In both cases, the linear effect of frequency on either latencies or extremity became non-significant when the other linear effect of frequency was controlled. Thus, this first theoretical explanation for the effect of repeated expression on subsequently expressed extremity is only partially supported by the data from our first two studies.

The second theoretical explanation for the polarizing effect of repeated expression rests on an associative learning analogy that underlies explanations for effects in some of the literature in the mere-exposure condition (i.e., Harrison, 1977; Zajonc, Markus, & Wilson, 1974). We briefly mentioned in the introduction that Perlman and Oskamp (1971) had found attitude polarization when the attitude object was repeatedly paired with an evaluative attribute. An explanation for this effect is that on repeated pairing the attribute is associated more strongly with the object, and its evaluative connotation is weighed more heavily in generating an overall evaluation of the attitude object. In a similar way, one can look at attitude expressions as responses that are associated more strongly with the object on repeated pairings of the object and response. With such repeated pairings, the associated response is given more quickly and confidently the more frequent the pairing, so long as the response format does not change. However, when the response language changes across trials, then more frequent pairings of a response with the object may result in some translation difficulties that affect expressed extremity.

To see how this might work, consider subjects in the forced-choice or dichotomous condition of the first study. Subjects repeatedly practice a response that indicates valence only, a response that would normally be the language associated with the endpoint of an attitude scale. When they are subsequently confronted with a continuous attitude rating scale, the more frequently they have practiced the valence-only response, the more likely they are to indicate a response near the scale endpoint. Thus, simple repeated pairings of endpoint language with the object lead to more extreme responses.

Now consider the same explanation applied to the repeated oral-expression condition of the second study. Subjects in this situation repeatedly pair an oral response with the object, and that oral response is therefore more strongly associated with the
object with more frequent expressions. But across expressions, our data suggest that the expressions themselves become simpler, more concise, and more extreme. The verbal expressions are given with fewer qualifications the more frequently they are given in response to a particular object. Thus, with more frequent verbal expressions, the associated response is more extreme, and that more extreme response is then mapped onto the continuous response scale when the ultimate scale judgment is requested.

If this associative learning explanation for the effects of repetitive expression on extremity is correct, then it ought to be found regardless of whether the judgment is an evaluative one. Our argument is simply that a judgmental response becomes more strongly associated with the object that elicits that response across repetitions and that this stronger association may lead to more extreme subsequent judgments in certain circumstances. In Study 3, we examined whether the same two judgmental conditions that induced extremity in Studies 1 and 2, namely, a condition in which repeated judgments were made in a forced-choice format and a condition in which repeated judgments were made orally, would lead to more extreme judgments when the judgment was nonevaluative.

In this third study, subjects were confronted with Chinese ideographs that varied in their color or hue, from a relatively pure red to a relatively pure blue, with numerous shades of purple in between. Each ideograph was consistently seen in only one hue, and the frequency of exposure was varied, such that some ideographs of the same hue were seen more frequently than others. Each time an ideograph was seen, subjects either indicated whether its predominant hue was red or blue (i.e., to replicate the forced-choice condition of Study 1) or orally indicated what they thought its hue to be, unconstrained by any particular judgmental language (i.e., to replicate the oral expression condition of Study 2). At the end of the stimulus exposure trials, subjects saw each ideograph in black and made a judgment about the hue in which it had previously been seen, using a 9-point judgmental rating scale, in which a 1 meant that the hue of the stimulus was thought to have been pure red and a 9 meant that the hue of the stimulus was recalled as pure blue. If the judgmental response is associated more confidently with the stimulus with increased repetitions, then we expected that more extreme hue judgments should be found for ideographs that had been seen more frequently during the stimulus presentation phase of the experiment, regardless of whether hue judgments during that phase had been made orally or in a forced-choice response format.

Study 3

Method

Subjects. Subjects were 55 undergraduates at the University of Colorado, who participated in partial fulfillment of an introductory psychology course requirement. As subjects entered the laboratory, they were randomly assigned to one of the two experimental conditions. They participated in the study individually.

Design. Frequency of exposure varied within subjects; some Chinese ideographs were seen three times; some, five times; and some, eight times. Each ideograph was consistently portrayed in one of nine color shades that varied from a pure red hue to a pure blue (with various shades of purple in between). In total, subjects saw 27 different ideographs, one in each cell of the two crossed-within-subjects factors of frequency (with three levels) and hue (with nine). The between-subjects manipulation concerned the format of the color judgments made during the learning phase of the study. Half of the subjects orally expressed the color they judged each ideograph to be and were not restricted in the kind of descriptions that they could give (free condition). The other half also expressed the color of each ideograph on its presentation, but they did so with a forced-choice response format, indicating whether they judged it to be predominantly red or predominantly blue (forced-choice condition).

Stimulus materials. The Chinese ideographs were presented on a Mac II color monitor. They were about 4 inches (10.16 cm) high and 2 to 3 inches (5.08 to 7.62 cm) wide. The ideographs were in color against a white background. The colors were chosen from the 256-color spectrum provided by an application called Image 1.41. On this color spectrum, a pure red corresponds to the value 250 and a pure blue to the value of 178. Seven intermediate values were chosen, nine units apart from each other, to represent the seven intermediate shades of purple. It should be noted that the shades were equally spaced on the color spectrum provided by image, but this does not necessarily mean that the shades were perceptually at equal distances. To unconfound specific ideographs with specific colors across subjects, we created two sets of the 27 ideographs, with each ideograph appearing in a different color in each set. Subjects in each condition were randomly assigned either to Set 1 or to Set 2.

Procedure. As subjects entered the laboratory, they were seated in front of the computer. They were told that during the presentation phase they would see a certain number of Chinese ideographs that appeared in various shades of purple varying from pure red to pure blue. It was made clear that the subjects' main task was to memorize the color in which each of the ideographs appeared. Subjects were instructed to describe first the shape of the ideograph (e.g., "a dog") and then its color. In the free condition, subjects were told "to describe the color in whatever words you want," whereas in the forced-choice condition, they were asked to describe the color as either red or blue depending on what color they thought was dominant. Subjects were not given the opportunity to pace themselves—each ideograph was presented for 6 s, with a 1-s interstimulus delay. In total, there were 144 stimulus presentations during this learning phase (i.e., nine ideographs presented three times, nine presented five times, and nine presented eight times). The order of stimulus presentation was individually randomized.

During the testing phase, subjects saw the same 27 ideographs in black in a random order and were asked to recall the color in which they were presented previously. A 9-point rating scale appeared on the computer screen under each ideograph, with the endpoints labeled red and blue. Subjects were instructed to indicate the color in which they thought each ideograph had been presented by pressing one of the correspondingly numbered keys at the top of the computer's keyboard as quickly and as accurately as they could. Responses and response latencies were recorded.

Results and Discussion

Our primary hypothesis in this study was that stimuli seen more frequently during the learning phase of the study would be judged more extremely during the testing phase by all subjects, regardless of whether color expressions during the learning phase were given under the forced-choice format or were unconstrained. To test this hypothesis, we computed two different indices of judgmental extremity. First, we computed for each subject the standard deviation of judgments at each fre-
frequency level. Second, we computed the absolute deviation from the scale midpoint (i.e., 5) for each judgment and averaged these for all ideographs seen at a given frequency by each subject. The mean values for both of these indices, broken down by frequency and the between-subjects condition (i.e., form of expression) are shown in Figure 2.

The frequency by form of expression analysis of variance of these indices revealed a reliable linear trend for frequency in both cases; for the standard deviation measure, $F(1, 53) = 12.42, p = .001$; for the average absolute deviation measure, $F(1, 53) = 4.13, p = .047$. Neither of these frequency effects was qualified by the between-subjects difference in the form of expression, although the main effect of form of expression was reliable in the analyses of the average absolute deviation from the scale midpoint, $F(1, 53) = 4.70, p = .035$. Not surprisingly, more extreme judgments were generated on average in the forced-choice condition than in the free-response condition. In summary, regardless of whether subjects expressed each color as a forced choice between red and blue colors or used whatever verbal expression they wished to describe the color, they gave more variable or more extreme color judgments for ideographs that had been seen more frequently, even though the full range of colors was used for ideographs presented at each frequency.

The response latencies during the testing phase of the study were analyzed as a function of stimulus color, frequency of presentation, and form of expression. Overall, subjects in the

![Figure 2](image-url)
forced-choice condition gave their color judgments during the testing phase of the study more quickly than subjects in the free-response condition, $F(1, 53) = 4.30, p = .043$. Stimuli seen more frequently were judged more quickly by all subjects, $F(1, 53) = 34.65, p < .001$, although the linear effect of frequency on latency was stronger for subjects in the forced-choice condition than for subjects in the free-response condition, $F(1, 53) = 4.04, p = .05$. The relevant means portraying these two main effects and their interaction are shown in Figure 3. Finally, stimuli presented in more pure red or more pure blue colors were judged more quickly than stimuli that appeared in intermediate shades of purple, test of stimulus color quadratic trend: $F(1, 53) = 86.91, p < .001$. This quadratic effect did not depend on form of expression. Thus, stimuli that were portrayed in more extreme colors on the judgmental continuum were judged more quickly.

These data suggest that more frequent exposure to the stimuli led both to more extreme and to faster judgments of their colors. Thus, subjects in both the forced-choice condition and the free-expression condition registered more extreme and faster color judgments for stimuli seen more frequently.

General Discussion

The purpose of this research has been to demonstrate that attitudes that are expressed more frequently can become more extreme or polarized as a result. In the first study, we showed that more frequent expression led to greater extremity when expressions were given with a forced-choice valence-only format. On the other hand, when repeated expressions were given with a continuous scalar response, frequency had no polarizing effect, consistent with the lack of effect reported by Powell and Fazio (1984). In the second study, we showed the generality of the effect of frequency of expression on extremity by demonstrating that attitudes given more frequent verbal expressions become more extreme, both in the content of the verbalizations expressed and in subsequent attitude-scale ratings.

Following these demonstrations, we then speculated about
the theoretical mechanisms that may be responsible for the effects of expression frequency on extremity in appropriate conditions. Two different but complementary theoretical models were suggested. The first of these was based on the notion that judgments of attitude intensity or extremity are in part made by subjects reflecting on the facility with which the attitude comes to mind. Because well-practiced attitudes come to mind more easily than those that are less well practiced, more frequent expressions may give rise to more extreme subsequent reports, so long as the repeated expressions are not all given on a scale on which the approximate extremity of responses can be retained from trial to trial. Thus, repetitive expression gives rise to more accessible attitudes. Increased accessibility in turn results in greater expressed extremity, so long as the repetitions have not used a constant scale format in which expressed extremity may be retained across repetitions. Although this account seems quite plausible, it does suggest that the effect of frequency of expression on response latency should persist even when response extremity is statistically controlled. The data from Studies 1 and 2 were not consistent with this expectation.

Our second explanation for the effect of frequency of expression on expressed extremity relied on an associative learning model in which an emitted response is associated more strongly with the presented object the more frequently that response has been paired with the object. When the practiced response is a forced-choice one, in which the subject essentially repeats what will subsequently become judgmental scale endpoints, then more extreme subsequent judgments on continuous scales ensue because, across repetitions, the language associated with the scale endpoints has become more strongly associated with the object. The interesting extension of this explanation occurs in the oral expression condition of the second study, in which more frequent oral expressions are given with fewer qualifications and are more extreme. These more extreme responses, across repetitions, become associated with the object. As a result, the extremity of subsequent scale ratings is a function of the frequency of prior oral expression.

The third study we conducted was designed to demonstrate the plausibility of this explanation of the effect of frequency of expression of attitude extremity by showing an analogous effect on nonevaluative judgments. In that study, subjects made color judgments of Chinese ideographs that were presented in various shades of purple. During the presentation trials, subjects either made a forced-choice judgment of whether the ideograph was primarily red or blue or simply verbally identified the ideograph's color using whatever language they preferred. During the testing phase of the study, when subjects made judgments of the color in which each ideograph appeared, ideographs that were seen more frequently during the presentation trials were judged more extremely on a 9-point red-to-blue scale than were ideographs seen less frequently. This effect was found regardless of whether subjects were in the forced-choice or the free-expression condition.

The value of this third study lies in its potential ability to clarify the process that induces polarization of attitudes from repeated expressions. We draw an analogy between the repeated expression of an attitude with a learning situation in which a response is repeatedly associated with a stimulus object. The associative learning explanation is simply that the response is associated more strongly with the object the more frequently it is practiced. When the associated response involves a label that will subsequently be a scale endpoint, as in the forced-choice condition, then more extreme scalar judgments result from more frequent associations of the response and the object. When the response is a verbal judgment, unconstrained by any particular response format, then this verbal judgment itself tends to simplify and polarize across trials (as in the verbal expressions of Study 2), and subsequent scalar responses are more extreme.

Although we think that the third study nicely illustrates the process that may account for polarization induced by frequent expression, there are many differences between the situation in which a subject is learning the color of a stimulus object and the situation in which a subject is expressing an evaluation of an object. Most obviously, in the color-judgment situation, the cues that determine the judgment are cues that reside in the stimulus object itself. Thus the learning trials ask the subject to learn a response that is mandated by the actual color of the stimulus object. On the other hand, in the case of repeated attitude expressions, the subject is presumably only practicing an internal evaluative response to the object that to some extent has already been learned through prior practice. Thus, the analogy constructed in this third study is probably most appropriate to cases in which the subject is asked to repeatedly express his or her evaluation of an issue or object when no attitude previously existed. We really do not want to press the aptness of the analogy too far nor do we want to suggest that the same associative learning process that seems to be responsible for the polarization of judgments induced by frequency in this study is necessarily the same process underlying the frequency effect on polarization in the first and second studies. Our purpose in the third study was simply to illustrate a process that conceivably underlies the effects of repeated expression on attitude extremity.

At this point, we are not in a position to make claims about the stability or behavioral importance of the polarization induced by repeated expression. Just as the effects of repeated expression on response latency may be expected to attenuate over time, so too we suspect that repeated expression effects on polarization may also attenuate. However, to acknowledge attenuation of the effects of repeated exposure on both response latency and response extremity is not to belittle the possible behavioral implications of these effects. The logic of the argument made by Fazio is that repeated expressions lead to greater accessibility (Powell & Fazio, 1984), which in turn leads to greater attitude–behavior correspondence (Fazio & Williams, 1986). It seems to us that exactly the same argument can be made when the mediating variable in this process is attitude extremity rather than attitude accessibility. Namely, repeated oral expressions of an attitude lead to greater extremity, and that greater extremity leads in turn to an increase in the correspondence of subsequent behavior with the attitude. We are currently extending the work reported in this article to examine these behavioral implications.

References


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