

Effects of Message Repetition and Position on Cognitive Response, Recall, and Persuasion

John T. Cacioppo
University of Notre Dame

Richard E. Petty
University of Missouri—Columbia

Although the mere exposure effect has been researched widely, surprisingly little is known about the attitudinal and cognitive effects of message repetition. It was hypothesized that the sequence of topic-relevant thoughts generated in response to a (repeated) persuasive message would parallel attitude change. To test this prediction, two experiments were conducted. In Experiment 1, individuals heard a communication either zero (control), one, three, or five times in succession, rated their agreement with the advocated position, and listed the message arguments they could recall. In Experiment 2, individuals heard a communication either one, three, or five times, rated their agreement, listed their thoughts, and listed the message arguments they could recall. In both experiments, agreement first increased, then decreased as exposure frequency increased (regardless of the position advocated), but agreement was unrelated to the recall of the message arguments. In Experiment 2, analyses of the listed thoughts revealed that counterargumentation decreased, then increased, whereas topic-irrelevant thinking increased as exposure frequency increased; as expected, only topic-relevant thoughts were related to agreement. These results are interpreted in terms of an attitude-modification model in which repetition and content of a persuasive advocacy affect the type and number of thoughts generated; these thoughts, in turn, affect the attitudinal reaction to the advocacy.

In this article, we will consider the attitudinal effects of repeated exposure to persuasive communications, an area that has generated surprisingly little research by social psychologists despite its frequent occurrence in and importance to everyday life. This area is not well understood (cf. Harrison, 1977), in part because most research has focused on repetition in contexts that do not involve communication. In Zajonc's (1968) original statement on the effects of repeated exposure, evidence was provided for relationships between (a) the frequency of usage and evaluation of words, (b) the frequency of interpersonal contact and attraction, and (c) the familiarity of aesthetic stimuli (e.g., musical selections) and liking. Since then, immediate effects of mere exposure have been observed

using children as well as adults (Heingartner & Hall, 1974), employing between-subjects (Moreland & Zajonc, 1976) as well as within-subjects (Crandall, 1972) designs, in field (Zajonc & Rajecki, 1969) as well as laboratory (Matlin, 1970) settings, employing pictorial magazine advertisements (McCullough & Ostrom, 1974) as well as nonsense syllables (Harrison & Hines, 1970) as stimuli, and using stimuli evaluated initially either positively or negatively (Hamm, Baum, & Nikels, 1975; Zajonc, Markus, & Wilson, 1974).

However, conditions in which the exposure-liking relationship breaks down have also been identified. When the stimulus is simple, repetition leads to either a decrease in liking (Skaife, cited in Berlyne, 1971, pp. 191-194) or an initial increase, then decrease in liking (Saegert & Jellison, 1970; Smith & Dorfman, 1975). The homogeneity of the stimulus sequence presented seems also to be an important factor. A stimulus that is presented

Requests for reprints should be sent to John T. Cacioppo, Department of Psychology, University of Notre Dame, Notre Dame, Indiana 46556.

repeatedly within a homogeneous sequence of stimuli results typically in first increasing, then decreasing liking of the stimulus (Harrison & Crandall, 1972). Moreover, when subjects are able to expose themselves to stimuli, they first display exploratory behavior and then expose themselves repeatedly to a self-selected subset of best-liked stimuli (Brickman & D'Amato, 1975). And finally, when measurement is administered immediately after the presentations of a stimulus, exposure effects may be attenuated or obliterated (Johnson & Watkins, 1971; Stang, 1974; Stang & O'Connell, 1974).

Models of Exposure Frequency and Affect

Several theoretical accounts have been offered for these results, including (a) response competition, (b) arousal theories, (c) classical conditioning, (d) intuition as artifact, (e) expectancy arousal, (f) satiation/generation, and (g) two-factor theories (see Harrison, 1977, and Stang, 1973, for reviews). Of these interpretations, the two-factor theories provide the most flexible explanation because they "can account for any pattern of results (by drawing differentially on each factor)" (Harrison, 1977, p. 74). However, two-factor theories are not cogent unless the contribution of each factor can be described a priori.

Berlyne (1970) proposed an inverted-U relationship between familiarity and liking. The notions are that (a) two separate and opposing psychological processes, positive habituation (that is, a reduction in uncertainty or conflict) and tedium, operate simultaneously; (b) the relative strengths of each vary as a function of exposure to the stimulus; and (c) initially, the process of habituation has greater impact on liking than does tedium. Thus, repeated exposure leads initially to liking, but ultimately leads to disliking. Accordingly, stimulus complexity and sequence heterogeneity slow the positive habituation process and extend the inflection point of the inverted-U curve to higher levels of exposure.

Stang (1973, 1975) proposed an extension of Berlyne's (1970) two-factor account: Repeated exposure provides more opportunity to

learn about the stimulus; this learning is presumably rewarding and leads to increased liking for the stimulus. With continued repetition of the stimulus, however, boredom or satiation develops; hence, repeated exposure leads ultimately to negative affect toward the stimulus.

Stang (1975) presented three experimental demonstrations that affect toward and learning of Turkish words and trigrams were affected similarly by exposure frequency. Although these results may indicate that learning mediated liking, there are three other possibilities. First, liking may have mediated learning rather than vice versa. Second, both learning and affect may have been mediated by a third variable. For instance, the cognitive elaboration of stimuli results in both enhanced recall (Craig & Lockhart, 1972; Craig & Tulving, 1975; Rogers, Kuiper, & Kirker, 1977; Cacioppo & Petty, Note 1) and polarized affect (Petty & Cacioppo, 1977; Petty, Wells, & Brock, 1976; Tesser & Conlee, 1975; Tesser & Leone, 1977). Stimulus learning, however, has not been related consistently to affective reactions (cf. Greenwald, 1968; Petty, 1977). Nevertheless, repeated exposure does provide the opportunity for more elaborate processing of the stimuli (Wyer, 1974, pp. 15-16). Thus, there is the distinct possibility that cognitive elaboration (or extent of semantic processing) mediates both learning and affect.

This latter interpretation may appear at odds with some of the existing research on mere exposure. Specifically, preexposure liking for the stimulus does not necessarily alter the direction or form of the exposure effect (Zajonc et al., 1974). But in the domain of persuasive communication, Petty et al. (1976) demonstrated that it is not the preexposure affect toward an advocacy but the nature of the associates (i.e., cognitive responses) elicited by the message that determines the attitudinal effect of a communication. Indeed, a slightly different form of their hypothesis has been employed in past studies of mere exposure as well (Brickman, Redfield, Harrison, & Crandall, 1972; Mitchell & Olson, 1977; Pearlman & Oskamp, 1971). For example, repeated presentations of words that elicited

either positive or negative associations resulted in a polarization of affect toward the stimuli (Grush, 1976). Finally, the third possibility is that although learning and affect show similar patterns, they are mediated *independently*.

Cognitive and Attitudinal Effects of Message Repetition: Two Studies

The current experiments focus on the relationships among attitudinal, associative, and learning effects of message repetition. These experiments differ in several important respects from previous research on message repetition and attitudes. McCullough and Ostrom (1974) found an exposure effect when they presented messages repeatedly in a magazine advertisement format to subjects. However, each presentation differed in the phrasing and ordering of the message arguments, and a different photograph and headline accompanied each presentation. Weiss (1971) presented the same argument repeatedly and found that exposure led to quicker ratings of agreement with the argument. However, to the extent that practiced responses are also quicker, Weiss's results may be irrelevant to the study of message repetition and attitudes. Finally, Wilson and Miller (1968) and Johnson and Watkins (1971) found an attitudinal effect for message repetition only on a delayed posttest. The absence of the immediate attitudinal effect is due presumably to satiation (cf. Harrison, 1977; Sawyer, in press; Stang, 1974). Thus, if a wider variety of levels of message repetition, more complex stimuli, or a more heterogeneous stimulus sequence had been studied, immediate attitudinal effects might have been observed. In the present studies, Experiment 1 was primarily methodological and exploratory in nature, serving as a test of the experimental materials and of the effects of the repetition of persuasive communications on liking and learning. Experiment 2 was designed to assess the viability of the various possible processes mediating the liking and learning effects in repetition experiments using such stimuli.

To explore more fully the predictive value of two-factor theories, experimental condi-

tions were designed to elicit first increasing, then decreasing favorability toward the advocacy. Mere exposure research indicates that the inflection of the inverted-U function between exposure and affect occurs more quickly when stimuli are homogeneous (Harrison & Crandall, 1972) and simple (e.g., Smith & Dorfman, 1975) and ratings are made immediately after their presentation (Stang, 1974). In the present experiments, one of two persuasive communications was presented either one, three, or five times in succession, and the dependent measures were administered immediately afterwards. We expected to find that agreement with the advocacy would increase, then decrease as exposure frequency increased.

Experiment 1

Method

Subjects and procedure. One hundred thirty-three introductory psychology students participated in an experiment employing a 2×4 factorial design in which the position advocated (proattitudinal versus counterattitudinal) and the number of presentations (0, 1, 3, or 5) served as between-subjects factors. Subjects were tested in groups of 12 to 29 in language-laboratory cubicles constructed so that no subject could have visual or verbal contact with any other subject. During any one session, in which one level of repetition was presented, half of the subjects heard the proattitudinal message over the headphones, while half of the subjects heard the counterattitudinal message over the headphones. Following a procedure employed previously by Petty and Brock (1976), the same highly persuasive arguments, which were equally applicable to each advocacy, were used in each communication. Thus, the affective qualities of the elicited associates (Grush, 1976) or cognitive responses (Greenwald, 1968; Petty & Cacioppo, 1977) were presumably equated for the two communications.

Two groups (the zero-exposure pro- and counterattitudinal conditions) rated their agreement with a recommendation that university expenditures be increased. One group was told that the expenditures were to be financed by instituting a 25% service tax on visitor luxuries (proattitudinal position), and one group was told that a \$70-per-quarter increase in student tuition would be instituted to finance the expenditures (counterattitudinal position). Ratings were made on a 15-point Likert-type scale where 15 indicated "agree completely" and 1 indicated "disagree completely."

Subjects in each of the remaining cells heard a taped message through headphones either one, three, or five consecutive times. The message contained a

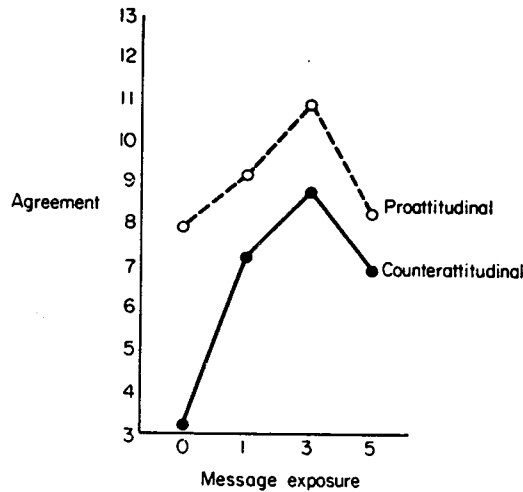


Figure 1. The effects of preexposure position and message repetition on agreement: Experiment 1.

statement that the university currently provided a substandard level of education to the undergraduates and that this problem could be remedied by increasing university expenditures. Half the subjects heard a message that contained a paragraph about instituting a 25% service tax on visitor luxuries to finance the expenditures, and half heard a message that contained a paragraph about instituting a student tuition increase of \$70 per quarter to finance the expenditures. All subjects then heard the following eight arguments in favor of increasing expenditures: (a) Teaching and educational materials for students would be improved; (b) classroom sizes would be reduced; (c) handouts containing the important points in lectures could be provided; (d-f) the library facilities, job placement, and placement in graduate and professional schools could be improved; (g) better teachers could be hired; and (h) improved counseling to students, on both academic and personal matters, could be provided.

A postexperimental questionnaire containing 15-point Likert-type scales was used to assess the effects of the advocated position and message repetition on agreement with increasing university expenditures and to assess the perceived amount of distraction, effort, and involvement in the task. A recall measure was obtained after completion of the questionnaire by asking subjects to list on the last page of their booklets all of the message arguments that were presented in the communication. A judge, blind to the experimental conditions, counted an item as recalled if it correctly summarized one of the eight message arguments listed above. After completing the dependent-variable booklets, subjects were debriefed, thanked, and dismissed.

Results and Discussion

Attitude measure. The means for each cell on the attitude measure are displayed in Fig-

ure 1. It was expected that (a) subjects would agree more with the pro- than with the counterattitudinal advocacy, and (b) repetition would lead to increasing, then decreasing agreement with the advocacy. The analyses supported both hypotheses: Subjects agreed more with the pro- ($M = 9.05$) than the counterattitudinal message ($M = 6.62$), $F(1, 125) = 14.87$, $p < .001$; the number of presentations of the message affected agreement ($M_0 = 5.58$, $M_1 = 8.23$, $M_3 = 9.83$, $M_5 = 7.70$), $F(3, 125) = 7.74$, $p < .001$; and the interaction between position advocated and number of presentations did not approach significance ($p > .25$). Because the lack of an interaction indicated that the position of the advocacy (pro or counter) did not alter the effect of message repetition on agreement, trend tests were conducted on the data collapsed across position. The trend analyses were conducted according to Gaito's (1965) procedure for determining trend coefficients for unequal spacing and unequal n . A significant quadratic trend on the agreement measure, $F(1, 125) = 25.45$, $p < .001$, provided evidence of a curvilinear effect of message repetition on agreement (see Figure 1). Pairwise comparisons using the Newman-Keuls procedure for unequal n (Winer, 1971, pp. 215-218) revealed that presentations of the same persuasive message one, three, or five times led to increasing, then decreasing agreement ($ps < .05$).

Recall and ancillary measures. An analysis of the number of message arguments recalled revealed that message repetition, $F(2, 79) = 12.04$, $p < .001$, and message position, $F(1, 79) = 14.27$, $p < .001$, altered the incidental learning of the message arguments. The first main effect indicated that learning increased with repetition. The mean number of arguments recalled at one, three, and five repetitions, respectively, was 4.08, 4.67, and 6.00. The second main effect indicated that subjects recalled more message arguments when the position advocated was counterattitudinal ($M = 5.54$) than when the position advocated was proattitudinal ($M = 4.29$). Compared to previous research on selective learning (cf. Greenwald & Sakumara, 1967), Experiment 1 had the following methodological advantages:

(a) Subjects with initially similar attitudes were assigned randomly to pro- and counterattitudinal conditions rather than selecting subjects for participation on the basis of their initially different attitudes; (b) the message arguments to be learned by the different groups of subjects were identical, though they were used to support either a pro- or a counterattitudinal advocacy. Thus, the differential learning could not be attributed to the ease with which the arguments could be learned.

In addition, a Message Position \times Message Repetition interaction was found, $F(2, 79) = 5.10$, $p < .01$. Specifically, the increase in recall was greatest between three and five repetitions of the proattitudinal advocacy ($p < .05$) and between one and three repetitions of the counterattitudinal advocacy (n_s —all comparisons made using the Newman-Keuls procedure for unequal n).

The first experiment provided strong support for the notion that a persuasive appeal presented repeatedly in close temporal proximity leads to increasing, then decreasing acceptance of the advocacy. However, the finding that more message arguments were recalled when the advocacy was disliked initially (i.e., counterattitudinal) than when it was liked initially (i.e., proattitudinal) suggests that liking does not necessarily result in greater learning. The results of Experiment 1 are also at odds with the learning-leads-to-liking hypothesis. This is especially dramatic for the proattitudinal advocacy: The greatest increase in affect (between one and three repetitions) was associated with no change in learning, whereas the greatest learning (between three and five repetitions) was associated with a decrease in affect. A within-cell correlation (Insko, Lind, & La Tour, 1976, p. 69) between agreement and recall indicated that these variables were not related significantly ($r = -.02$).

Analyses of the ancillary measures (effort, involvement, and distraction) revealed that they were not affected by any of the manipulations.

Experiment 2

A second experiment was conducted to investigate other possible mediators of the ex-

posure effect observed in the preceding experiment. Of particular interest in Experiment 2 was the possibility that a recipient's cognitive responses would be influenced by message repetition and would predict more accurately the subsequent attitudinal reactions than would learning. Indeed, evidence already exists for just such a hypothesis. Grush (1976) investigated the effects of repeatedly presenting infrequently used words that elicited either positive or negative associations. He found that words that elicited positive associations were evaluated more positively after repeated exposures, but that the opposite effect occurred for words that elicited negative associations. Grush proposed an attitude-formation explanation of his results. The notion is that a stimulus initially elicits only a few cognitive responses (associations). With repeated exposure, subjects generate increased (or increasingly consistent) cognitive responses to the stimulus (thus, it is similar in some respects to the response competition interpretation). The final evaluation of an exposed stimulus is assumed to be a function of the summed evaluations of the cognitive responses it elicits. If the responses are generally favorable, increased exposure should lead to a more positive evaluation of the stimulus, but if the responses are generally negative, increased exposure should lead to a less favorable evaluation of the stimulus.

Miller (1976) investigated the effects of mere exposure using communicative stimuli (posters containing a political message) and found that moderate but not high levels of exposure led to attitude change (increased agreement). Miller argued that the high exposure loads caused individuals to feel that their personal freedom was being restricted, and reactance (Brehm, 1966) led to resistance to persuasion. It is equally possible, on the other hand, that an unpleasant state of satiation (e.g., boredom) developed at the high exposure levels. These models suggest that the cognitive responses (i.e., counterarguments, favorable thoughts, neutral/irrelevant thoughts) elicited in a repetition experiment may mediate the affective reactions to the stimulus. However, no study to date that has employed repetitions of the same persuasive

communications has investigated the nature or the temporal sequence of the cognitive responses elicited. Thus, in Experiment 2 subjects heard the previously tested pro- or counterattitudinal advocacy either one, three, or five times in succession. Afterwards, subjects (a) were instructed to list everything about which they had thought during the preceding minutes, (b) rated their attitude toward the advocacy and completed ancillary measures, and (c) responded to a measure of the incidental learning of message arguments.

Method

One hundred ninety-three introductory psychology students participated in an experiment employing a 2×3 factorial design in which the position advocated (pro- versus counterattitudinal) and the number of presentations (1, 3, or 5) served as between-subjects factors.¹ As in Experiment 1, subjects were tested in groups of 12 to 29 in cubicles in a language laboratory. During any one session, in which one level of repetition was presented, half the subjects heard the proattitudinal and half the subjects heard the counterattitudinal message through headphones. Subjects rated their agreement with increasing university expenditures on a 15-point Likert-type scale and completed the postexperimental questionnaire. In a procedure adapted from Brock (1967) and Greenwald (1968) and employed previously by Petty and Cacioppo (1977), subjects were given 3 minutes to list the actual thoughts that occurred to them during the presentations of the communication they had heard. Subjects were then asked to go back through the thoughts they had listed and to place a plus (+) next to each thought that supported the advocacy, a minus (-) next to each thought that attacked the advocacy, and a zero (0) next to each thought that was neutral or irrelevant to the advocacy. Subjects were then asked to list all of the message arguments they could recall. (Recall was scored in the same manner as in Experiment 1.)

Two judges who were blind to the experimental conditions rated the cognitive responses. Counted as unfavorable thoughts (i.e., counterarguments) were statements directed against the advocated position that mentioned specific unfavorable consequences, statements of alternative methods of raising money, challenges to the validity of arguments in the message, and statements of affect opposing the advocated position. Counted as favorable thoughts were statements in favor of the advocated position that mentioned specific favorable consequences, statements ruling out alternatives, statements that supported the validity of the message arguments, and statements of affect supporting the advocated position. All other listed items were rated as neutral/irrelevant thoughts. Similar items were counted as one

thought. Judges agreed on over 95% of the ratings; disagreements were resolved through discussion.

Results

Attitude measure. The mean for each cell on the attitude measure is graphed in Figure 2. As in Experiment 1, subjects agreed more with the pro- ($M = 9.61$) than the counterattitudinal advocacy ($M = 8.19$), $F(1, 187) = 6.48$, $p < .02$, and subjects agreed differentially as a function of the number of message repetitions ($M_1 = 8.09$, $M_3 = 9.77$, $M_5 = 8.86$), $F(2, 187) = 3.04$, $p < .05$. The interaction again did not approach significance ($p > .20$). Trend tests were conducted using Gaito's (1965) procedure for unequal n and revealed that message repetition resulted in a significant quadratic effect, $F(1, 187) = 9.86$, $p < .001$. Pairwise comparisons of cell means using Newman-Keul's procedure for unequal n provided evidence that agreement with the advocacy increased ($p < .05$), then decreased only marginally ($p < .10$) as exposure frequency increased.

Cognitive-response measures. The means for each cell on the cognitive-response measures are graphed in Figure 2. Overall analyses of variance revealed that subjects generated more counterarguments, $F(1, 187) = 10.71$, $p < .001$, and fewer neutral/irrelevant thoughts, $F(1, 187) = 4.35$, $p < .05$, in response to the counterattitudinal than in response to the proattitudinal advocacy. The number of message repetitions marginally affected the production of favorable, $F(2, 187) = 2.36$, $p < .10$, and neutral/irrelevant, $F(2, 187) = 2.61$, $p < .08$, thoughts. There were

¹ An additional factor included in the design was whether subjects were informed as to how many times they would hear the message prior to exposure. That is, half of the subjects were told that they were to hear a taped message one, three, or five times (the number being determined by the number of times they actually heard the message) so that they might have time to consider completely the taped communication. The other half of the subjects were told nothing about the number of times the communication would be presented. Analyses revealed that this factor made no difference on any of the measures obtained, and it will not be discussed further.

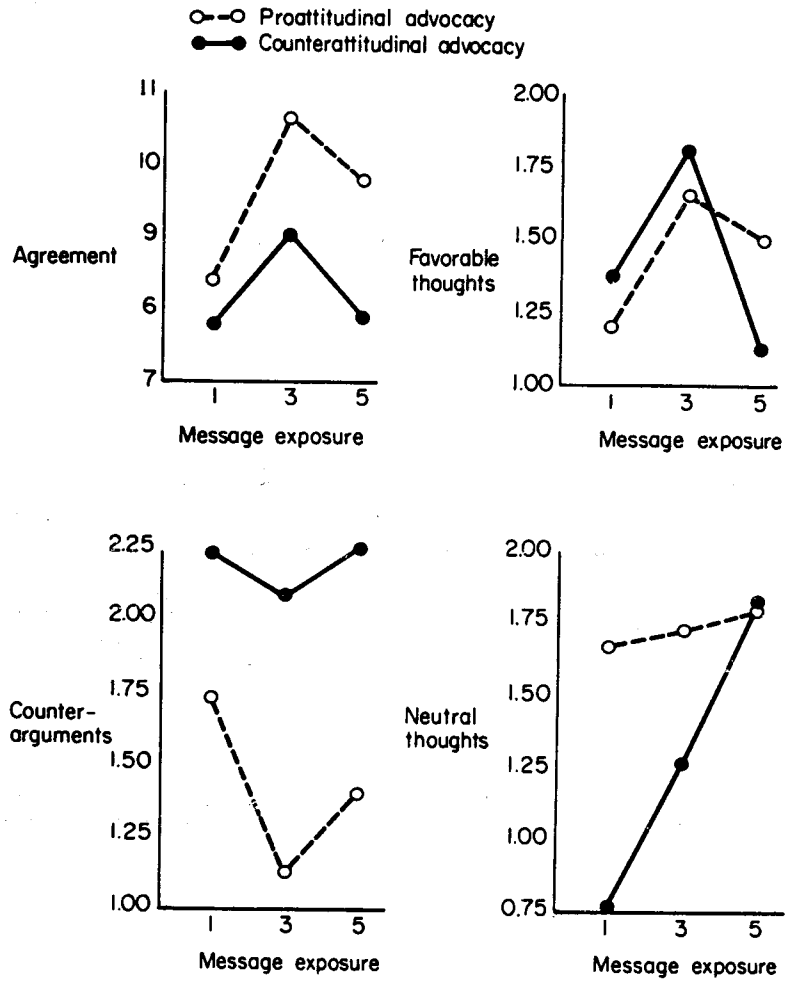


Figure 2. The effects of preexposure position and message repetition on agreement and cognitive response: Experiment 2.

no significant interactions; thus, trend contrasts were computed on the data collapsed across message position. The results of trend contrasts on each cognitive-response measure

(employing Gaito's procedure for unequal *n*) indicated that counterargumentation was affected quadratically, $F(1, 187) = 15.37, p < .001$, and neutral/irrelevant thinking was af-

Table 1
Within-Cell Correlations: Experiment 2

Variable	Agreement	Counter-arguments	Favorable thoughts	Neutral thoughts
Counterarguments	-.56			
Favorable thoughts	.45	-.45		
Neutral thoughts	.03	-.28	-.16	
Recall	-.01	.17	-.07	.02

fects linearly, $F(1, 187) = 5.87, p < .02$, as exposure frequency increased (see Figure 2).

Finally, a $2 \times 3 \times 3$ repeated measures analysis of variance was performed in which message position and exposure served as between-subjects factors and type of thought (i.e., counterargument, favorable thought, neutral/irrelevant thought) served as the within-subjects factor. The analysis yielded two interactions: (a) A significant Type of Thought \times Message Position interaction, $F(2, 370) = 6.14, p < .003$, revealed that the counterattitudinal advocacy elicited a greater number of topic-relevant thoughts (primarily counterarguments) and fewer neutral/irrelevant thoughts than the proattitudinal advocacy; and (b) a marginally significant Type of Thought \times Message Repetition interaction, $F(4, 370) = 2.02, p < .09$, showed that message repetition affected each type of thought differently (see Figure 2). Favorable thoughts increased, then decreased; counterarguments decreased, then increased; and irrelevant thoughts continually increased with repetition.

Recall and ancillary measures. The analysis of the number of message arguments recalled replicated the incidental learning finding in Experiment 1: More arguments were recalled when they were used to support the counterattitudinal ($M = 5.51$) than the proattitudinal ($M = 4.48$) position, $F(1, 187) = 14.63, p < .001$. Message repetition also affected message recall ($M_1 = 4.14, M_3 = 5.50, M_5 = 5.36$), $F(2, 187) = 11.49, p < .001$; the interaction, however, was not significant this time. Trend analyses (collapsed across message position) yielded significant F s for both the linear, $F(1, 187) = 14.14, p < .001$, and quadratic, $F(1, 187) = 15.01, p < .001$, trends.

The analyses of the ancillary measures revealed again that neither the position advocated nor the number of presentations affected any of these ratings.

Within-cell correlations. A within-cell correlation between each pair of dependent measures was calculated to provide measures of association between the variables with the effects of the treatments held constant. The results of these analyses are presented in Table 1. Note that agreement and topic-rele-

vant thinking (counterarguments and favorable thoughts) were interrelated highly, whereas learning of the message (recall), topic-irrelevant thinking (neutral thoughts), and agreement were relatively independent of each other.²

² Although the hypothesized attitude-modification process holds that the cognitive responses mediated agreement with the advocacy, other causal chains are possible. Following Osterhouse and Brock (1970), Insko, Turnbull, and Yandell (1974), Petty et al. (1976), and Petty and Cacioppo (1977), four analyses of covariance (ANCOVA) were conducted. The rationale for the procedure employed is discussed by Insko et al. (1974). The ANCOVA procedure compares specific causal models by holding constant statistically the postulated mediator between an initial variable and a final criterion variable. The relationship between these measures should be within error variance of zero when the mediator is held constant through the use of the covariance procedure; a reduction of a significant F for the criterion measure through the use of this procedure would suggest that the covariate mediated the criterion variable. The causal-model-testing procedure is adapted from Blacklock's (1964) technique using partial correlations, Scheffé's (1959) technique of examining partial slopes, and Cochran and Cox's (1957) technique employing analysis of covariance. Heise (1969) discusses the assumptions and problems of causal-model-testing analyses.

Separate 2×3 ANCOVAs were conducted using (a) counterarguments, (b) favorable thoughts, (c) neutral/irrelevant thoughts, and (d) recall as the covariate (i.e., initial variable) and agreement as the criterion variable. The originally significant F of 3.02 for the repetition main effect on agreement was reduced to F s < 1 when counterarguments and favorable thoughts served as the covariate. When neutral/irrelevant thoughts served as the covariate, the F of 3.02 was reduced to a marginally significant F of 2.41; when recall served as the covariate, the F for agreement remained significant at 11.24. When these analyses were repeated with agreement serving as the covariate, the marginally significant F of 2.36 for the repetition main effect on favorable thoughts was reduced slightly to 1.78; the marginally significant F of 2.61 on neutral/irrelevant thoughts became a significant F of 6.04; the nonsignificant F of 1.57 on counterarguments remained a nonsignificant F of .68; and the highly significant F of 11.49 on recall remained a significant F of 5.80. Interpretation of these analyses should be cautious, since the reliabilities of the measures are unknown. Nevertheless, the results are consistent with the notion that topic-relevant thinking mediates the effect of repetition on attitude, and they are inconsistent with the learning-leads-to-liking hypothesis.

Discussion

Although various research, including Experiment 2, has demonstrated that repetition influences learning and affect similarly, additional evidence provided in Experiments 1 and 2 suggests that this relationship in mere exposure research using persuasive communications is neither the result of learning leading to liking nor of liking leading to learning. Specifically, the within-cell correlations between learning and agreement in the experiments were near zero and nonsignificant. Additionally, the analyses of covariance (Footnote 2) suggested that although learning did not mediate agreement, the cognitive responses elicited by the communications did. Of course, it is possible that the learning-leads-to-liking hypothesis in mere exposure research applies only to stimuli that possess few cognitive associations (e.g., nonsense stimuli). The present experiments provide no evidence from which to evaluate this hypothesis.

The present experimental results indicated that regardless of the position advocated, message repetition led to (a) increasing, then decreasing agreement with the advocacy; (b) decreasing, then increasing counterargumentation; and (c) increasing topic-irrelevant thinking. Of importance is that the analyses of variance revealed that the sequence of the topic-relevant thoughts generated in response to the repeated messages paralleled the observed attitude change. It was hypothesized that the effects of message repetition on agreement were mediated by a two-stage attitude-modification process in which the repetition of the message arguments provided more opportunities to elaborate cognitively upon them and to realize their cogency and favorable implications. Hence, counterargumentation declined at the moderate exposure frequency. At high exposure levels, however, tedium and/or reactance may have motivated the individual to again attack the now offensive communication. Thus, counterargumentation was renewed, and agreement decreased at high exposure levels.

Validity of thought listings. It might be argued that the thought listings do not provide evidence about the nature of the sub-

jects' thoughts, but instead reflect what subjects thought the experimenter wanted them to list (Orne, 1962). This interpretation is considered unlikely in the present case because (a) the experimenter clearly *requested* a list of everything about which subjects had been thinking during the message; (b) although a complex pattern of counterargumentation was produced (first decreasing, then increasing), reports of topic-irrelevant thinking increased as exposure frequency increased; and (c) a between-subjects design was employed, making unlikely the successful intuiting of the experimenter's hypotheses. Furthermore, the position of the advocacies did not alter the exposure effects on the listed thoughts and attitude; although this result replicates previous research on mere exposure (Zajonc et al., 1974), it is unlikely that such an effect is common knowledge to naive subjects.

It might also be argued that subjects are unable to provide veridical information about the nature of their thoughts. Cacioppo, Harkins, and Petty (in press) and Cacioppo and Petty (Note 2) have argued that subjects are able to report accurately their recent and current thoughts and ideas and that the fact that subjects may be unaware of the *reasons for*, or *consequences of*, their thoughts (cf. Nisbett & Bellows, 1977; Nisbett & Wilson, 1977) does not invalidate the use of their responses in a content analysis. A thought-listing analysis assumes only that the thoughts and ideas of subjects are as accessible as are attitudes, judgments, facts, and so on (cf. Wyer, 1974). The burden then lies with researchers to determine whether a subject's cognitive responses are predictive of, or influential in, affect and behavior. It should be noted that although the present results are consistent with the hypothesized attitude-modification process and inconsistent with the learning-affect model, no definitive evidence concerning the causal role of cognitive responses is provided. Future research might fruitfully employ distraction to attenuate the dominant type of thought generated and/or vary message-argument quality to differentiate the nature of the dominant thought elicited.

Cognitive dynamics of message repetition. We have proposed that message repetition guides a sequence of cognitive reactions to a persuasive communication. But are the repeated presentations of the stimulus per se responsible for this sequence? We think not. It should be apparent that in the present experiments, the number of repetitions of a message was confounded with the available time to think about the message arguments, generate new topic-relevant thoughts, and so forth. This (additional) time to think has been shown to be necessary for individuals to process more deeply and elaborate more fully the content of an impending communication (Petty & Cacioppo, 1977), the persuasive arguments for a group decision (Burnstein & Vinokur, 1975, 1977), and the qualities of a stimulus (Tesser & Leone, 1977). For example, Tesser and his colleagues (e.g., Sadler & Tesser, 1973; Tesser & Conlee, 1975) have demonstrated that if persons are asked to think about some object or issue, the amount of time spent thinking is related to the amount of attitude polarization that results. Thus, objects that are liked initially are evaluated more favorably with increased thought, and initially disliked objects are evaluated more negatively. If we had simply presented subjects with the topics of the proattitudinal (increasing expenditures by instituting a visitor's tax) and counterattitudinal (increasing expenditures by increasing tuition) advocacies, *without the accompanying persuasive arguments*, we expect that we would have replicated the attitude polarization effect: More time to think would have produced increased agreement with the proattitudinal and decreased agreement with the counterattitudinal advocacy. However, we found that moderate repetitions of (and time to think about) the persuasive message arguments led to increased agreement with both the pro- and counterattitudinal advocacies. This finding supports the notion that the first stage of the attitude-modification process of message repetition involves enhanced opportunities to process the *content* of the message (which was the same for both pro- and counterattitudinal groups). Moreover, we found that high exposure frequencies of (and length-

ier time to think about) the message arguments resulted in decreased agreement with the advocacy. This result is consistent with the notion that the second stage of the attitude-modification process involves the development of tedium and/or reactance, which modifies the subsequent information-processing activity.

We assumed that individuals would be motivated to process personally involving stimuli (cf. Cialdini, Levy, Herman, Kozlowski, & Petty, 1976); thus, we employed communicative stimuli that were personally relevant to the individuals in the experiment. We also assumed that these individuals, if able, would be motivated to elaborate more fully the arguments contained in each advocacy. Thus, the provision of additional opportunities via message repetition to process the persuasive arguments contained in the advocacies would result in greater realizations of their validity, and not until the repetitions became excessive would this process yield to one motivated by reactance or tedium.

However, there are at least two other ways to account for the observed sequence of cognitive responses. First, since each of the arguments contained in the advocacies was in favor of an increase in spending, this general orientation may have served as a retrieval cue for initially accessing and generating topic-relevant cognitions that further supported an increase in spending. As the memorial pool of favorable thoughts was depleted, however, counterarguments would become increasingly accessible. Hence, according to this account, the *direction* of the message arguments is important rather than their cogency or persuasiveness.

A second plausible mechanism has been discussed by Burnstein and Vinokur (1975, 1977). The simple statement that others are advocating a position discrepant from one's own "may induce a person to reconstruct a line of reasoning which he thinks could have produced such (an advocacy)" (Burnstein, Vinokur, & Trope, 1973, p. 244). This model differs from Tesser's in that in this instance, the individual is motivated to consider, at least initially, all possible arguments that support the advocacy, since it has been made

salient to the individual that others endorse this view. Again, as the proargument pool in memory is exhausted, counterarguments become increasingly accessible. While this position is similar in many respects to our own, we place a greater emphasis on the cognitive responses elicited by the content and context of message repetition.

Cognitive dynamics and incidental recall.

Finally, a word might be said about the incidental recall findings of Experiments 1 and 2. In each experiment, it was found that persons recalled more message arguments used to support a counterattitudinal than a proattitudinal position. Neither familiarity nor novelty can account for this effect, because the same message arguments were used to support each position. Nor can a consistency explanation account for this effect, because best remembered were the arguments used to support a position *inconsistent* with the beliefs of the subjects.

Perhaps a more cogent account of the incidental recall findings can be provided by an analysis of the extent of processing of the pro- and counterattitudinal advocacies. Accumulated research has supported Craik and Lockhart's (1972) proposal that the depth or extent of processing influences the recall of a stimulus (e.g., Craik & Tulving, 1975; Rogers et al., 1977; Cacioppo & Petty, Note 1). It is interesting to note in light of this evidence that as discovered in Experiment 2, the counterattitudinal advocacies elicited a greater number of *topic-relevant thoughts* than did the proattitudinal advocacies. This effect was obtained even though the message arguments comprising each advocacy were identical. If one assumes that the number of listed topic-relevant thoughts indicates the extent to which the individuals elaborated cognitively upon the message arguments, then superior recall of the message arguments supporting the counterattitudinal rather than the proattitudinal advocacy would be expected. The results are in accord with this analysis.

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Received January 30, 1978 ■