THE EFFECTS OF PERSONAL RELEVANCE AND REPETITION ON PERSUASIVE PROCESSING

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Past research has suggested that familiarity with a message, brought about by repetition, can increase (Cacioppo & Petty, 1989) or decrease (Garcia–Marques & Mackie, 2001) analytic (systematic) processing of that message. Two experiments attempted to resolve these contradictory findings by examining how personal relevance may moderate the impact of familiarity on processing. Experiment 1 manipulated repetition and personal relevance and found that message repetition increased analytic processing (as reflected by greater persuasion following strong vs. weak arguments) under high relevance conditions and decreased analytic processing when relevance was low. In Experiment 2, both repetition and relevance were manipulated in different ways, but results again showed that repetition reduced analytic processing under low relevance conditions and that perceived familiarity mediated this outcome. Implications of these findings are discussed.

Three times in the same hour, a television commercial commands us to "tune in for 'Friends' on Thursday at 8 pm." Similar debates on two dif-

ferent news programs argue about when the economy will recover. And during the period of a few weeks at the height of campaign season, we hear over and over why one candidate deserves our vote more than another. As these examples illustrate, persuasive messages (like most other types of information) are often repeated and are in some manner familiar to us. Does this suggest that familiar messages are more effective at persuading us? And what impact does familiarity have on the processing of persuasive messages? Is a repeated (familiar) message processed more or less carefully than one that is not repeated? The research to date has yielded conflicting answers to these questions.

FAMILIARITY AND ANALYTIC PROCESSING

Cacioppo and Petty (1989) hypothesized and demonstrated that repeated persuasive messages were processed more analytically than those that were not repeated. Participants were asked to evaluate the sound quality of a message to be broadcast to the university community. The message was an appeal by a fictitious faculty committee stating that all seniors be required to pass a comprehensive exam in their major area of study prior to graduation. Repetition of both strong and weak versions of the message was varied by presenting the message either one or three times in succession. Cacioppo and Petty found that attitudes about comprehensive exams were only marginally more favorable in response to strong compared to weak arguments when the message was heard only once. However, when the message was repeated, attitudes were significantly more favorable following strong versus weak arguments. Having more favorable attitudes following strong compared to weak arguments is widely accepted as an indication of analytic processing, whereas having equivalent attitudes in response to strong and weak arguments indicates less of such processing, or what we term nonanalytic processing (e.g., Eagly & Chaiken, 1993). Therefore, Cacioppo and Petty's (1989) results supported their prediction that moderate repetition increases analytic processing. They believed this occurred because repeated exposures to a message afford additional opportunities for message elaboration. In essence, message repetition increases one's ability to attain "greater realization of the meaning, interconnections, and implications of the message arguments" (p. 4).

  This interpretation is consistent with findings from earlier work (Cacioppo & Petty, 1979, Experiment 2) in which participants heard a pro– or counterattitudinal message one or three times, rated their agreement with the message, and listed their thoughts in reaction to the advocacy. Results showed that as message exposure increased from one to three times, agreement with the message also increased and the number of counterarguments to the message decreased. These results supported

the notion that moderate repetition of the arguments "provided more opportunities to elaborate cognitively upon them and to realize their cogency and favorable implications" (Cacioppo & Petty, 1979, p. 105).

FAMILIARITY AND NONANALYTIC PROCESSING

In contrast to these findings, Garcia–Marques and Mackie (2001) demonstrated that repeated persuasive messages are processed less analytically than those that are not. In the first of two experiments, participants were presented with a message that opposed the implementation of governmentally enforced controls on American industry to minimize the effects of acid rain on the Northeastern states. Familiarity was varied by the number of times (one, two, three, or five) the message was presented. When the message was heard only once, participants were more persuaded by strong than weak arguments, indicating analytic processing; however, if the message had been repeated at all, participants were equally persuaded by strong and weak arguments, indicating nonanalytic processing.

A second experiment that used a more subtle manipulation of repetition replicated these findings. Instead of repeating the message successively, two messages were presented simultaneously. The participant was instructed to concentrate on a written message (presented on the computer screen) arguing the benefits of commercial weight loss centers, while the acid rain target message was played as background noise (in the repetition condition) or was not played at all (in the no–repetition condition). Later, all participants read the acid rain message. As in the first experiment, participants in the repetition condition showed no differentiation between strong and weak arguments, whereas those in the no–repetition condition did, suggesting that familiarity leads to nonanalytic processing.

As an explanation for these results, Garcia–Marques and Mackie (2001) drew heavily from theory and research in cognitive psychology. For example, mismatch theory (Johnston & Hawley, 1994) argues that intense cognitive effort directed at the processing of frequently encountered (familiar) stimuli squanders limited resources that could be devoted to new, unfamiliar stimuli. When a perceived stimulus context matches a memory trace, the initial bottom–up processing of that stimulus proceeds in an easy and fluid manner, which results in a sense of familiarity (e.g., Eich, 1982). The phenomenological sense of fluency, brought about by familiarity, signals that nonanalytic processing can safely be used. This allows one's limited resources to be used elsewhere. Research in a variety of areas of cognitive psychology supports this view. For example, Reder and Ritter (1992) used a paradigm in which participants decided to retrieve or compute answers to math problems under time pressure. They found evidence that familiarity with the

kinds of problems sparked a "feeling of knowing" the answer and decisions to use relatively effortless retrieval strategies. Less familiar problems led to decisions to use more effortful computational strategies. When participants had practiced particular types of problems and were later presented with similar (but novel) problems, they incorrectly opted to retrieve rather than compute the answers. Research on expertise also offers supporting evidence. Experts are individuals who have a great deal of experience (i.e., familiarity) with a particular area. When presented with information relevant to their area of expertise, they tend to rely on "top–down," relatively effortless processing strategies, whereas nonexperts do the opposite (Arkes & Freedman, 1984; Chase & Simon, 1973; Schmidt & Boshuizen, 1993).

PERSONAL RELEVANCE AS A RESOLUTION?

Thus, repetition has been shown to both increase (Cacioppo & Petty, 1989) and decrease (Garcia–Marques & Mackie, 2001) analytic processing. Detailed examination of these two sets of research reveals a number of methodological differences that could potentially account for the conflicting results. Among all these differences, one seems particularly important—personal relevance.

Participants in Cacioppo and Petty's (1989) study may well have experienced a relatively high level of personal relevance. The target issue in that study focused on the institution of senior comprehensive exams, an issue of undoubtedly high relevance to most undergraduate participants. In addition, the message was allegedly written by a faculty committee for broadcast to the university community, further legitimizing its seriousness, importance, and potential personal impact. This level of personal relevance may have inspired substantial elaboration on the part of Cacioppo and Petty's participants when they were given the opportunity for further processing. This is important because Cacioppo and Petty (1989) suggested that moderate repetition would only increase processing of a persuasive message when one is "motivated to think about the advocacy" (p. 4). On the other hand, the target message used by Garcia–Marques and Mackie (2001) concerned imposing governmental regulations on businesses to control acid rain. This message was not particularly involving for the participants, whose pretest ratings of involvement were only at the scale midpoint. Thus, Cacioppo and Petty (1989) may have found an increase in analytic processing with repetition because participants found the issue highly relevant, and Garcia–Marques and Mackie (2001) may have found the opposite pattern because participants dealt with a less personally involving issue.

Why might differences in personal relevance influence how message repetition affects processing? When personal relevance is high, partici-

pants typically process information carefully, and their attitudes are typically more influenced by the content of the arguments presented in the advocacy. Peripheral cues have relatively less impact on attitudinal outcomes. When relevance is low, the opposite is true. For example, Petty, Cacioppo, and Goldman (1981) had participants listen to a persuasive message containing strong or weak arguments advocating the implementation of senior comprehensive exams at their university in the near future (high relevance) or in 10 years (low relevance). In addition, they manipulated whether the source was prestigious (Princeton professor) or not (a high school student). When the message was of high personal relevance, participants were more persuaded by strong than weak arguments, and source expertise (the peripheral cue) had no impact on their attitudes. However, when the message was of little personal relevance, source expertise had a greater impact on attitudes than the strength of the arguments.

In general, when personal relevance is influenced by a manipulation that affects a respondent's ability to achieve important goals (e.g., to graduate from college, as in Petty et al., 1981), its impact on persuasive processing depends on argument quality. In their meta–analysis examining the role of involvement on persuasion, Johnson and Eagly (1989) showed that "outcome–relevant involvement" interacts with argument quality across several studies, such that those in high involvement conditions were more persuaded by strong and less persuaded by weak arguments than those in low involvement conditions. Results of studies such as those of Petty et al. (1981) and the meta–analytic findings of Johnson and Eagly (1989) suggest that high (outcome) relevance conditions typically result in analytic processing, whereas low relevance conditions result in nonanalytic processing.

If familiarity triggers nonanalytic processing, as suggested by Garcia–Marques and Mackie (2001), mismatch theory (Johnston & Hawley, 1994) and supporting research in cognitive psychology (e.g., Reder & Ritter, 1992), then its ultimate impact on persuasive processing may well be influenced by relevance. Chaiken (1987; Chaiken, Liberman, & Eagly, 1989) has argued that "systematic" (analytic) and less effortful processing can co–occur, leading to additive and interactive effects on attitudes. Furthermore, Chaiken has argued that nonanalytic processing occurs relatively (if not entirely) automatically, whereas analytic processing only occurs with sufficient cognitive ability and motivation. Therefore, if familiarity triggers nonanalytic processing, and relevance and thus motivation are low, no further processing may occur. When motivation and relevance are high, however, the nonanalytic processing triggered by familiarity may be complemented by the analytic processing triggered by increased motivation. Although both nonanalytic and analytic processing can co–occur in high relevance conditions, analytic processing likely "attenuate[s] the judgmental impact of [nonanalytic] process-

ing" because it "typically provides people with more judgment–relevant information than [nonanalytic] processing" (Eagly & Chaiken, 1993, p. 328). In other words, the nonanalytic processing triggered by familiarity may be overwhelmed in these circumstances because increased motivation leads to additional message scrutiny.

OVERVIEW AND PREDICTIONS

The goal of this research was to determine whether personal relevance moderates the impact of familiarity on persuasive–message processing, thus allowing a reconciliation of the contradictory findings in the literature. Cacioppo and Petty (1989) argued that message repetition would increase analytic processing (as indicated by an increasing divergence in persuasion following strong compared to weak arguments), assuming of course that message recipients had the motivation and capacity to process. In the first study, we replicated Cacioppo and Petty's (1989) method as closely as possible, while adding a parallel condition in which participants whose motivation was lower were also afforded the extra opportunity to process a message via repetition.

We predicted that the impact of message repetition on processing would depend on relevance. When relevance was low, we expected a repeated message to be processed less analytically than a nonrepeated one. In contrast, when relevance was high, we expected that the repeated message would receive more analytic processing than the nonrepeated one. As is typical, analytic processing was inferred from greater attitude change following exposure to strong, compared to weak, arguments.

EXPERIMENT 1

METHOD

Participants

Ninety–one (32 male and 59 female) University of California, Santa Barbara (UCSB) students received class credit for participation. Six seniors were excluded because their senior status nullified the relevance manipulation. Participants were randomly assigned to one of eight different conditions representing a 2 (argument strength: weak vs. strong) $\times$ 2 (relevance: low vs. high) $\times$ 2 (repetition: repetition vs. no–repetition) between–subjects factorial design.

Procedure

Instructions and Assessment of Initial Attitudes. Participants were led to believe that the experiment concerned the evaluation of the quality of a tape recording. Participants were seated individually in separate booths, where IBM PCs presented all instructions and experimental materials.

With the alleged purpose of collecting "control variables," we asked participants to report their gender, class, and hearing ability, as well as a number of attitudes on current topics. The key item addressed attitudes about comprehensive exams (*There should be a system of campus–wide comprehensive examinations as a requirement for graduation from UCSB*). Agreement with this statement was assessed using a 9–point scale with the endpoints "strongly disagree" and "strongly agree."

Manipulation of Relevance. Next, participants read a paragraph explaining the origin of the tape–recorded message and the reason its evaluation was needed by the Psychology Department. In the high relevance condition (based on Cacioppo & Petty, 1989), participants were told:

> The Psychology Department was asked to develop a study to evaluate the sound quality of an audiotaped message concerning an issue that is currently under consideration for change at UCSB. This audiotaped message was prepared by a faculty committee for possible broadcast in the university community. We are asking a small group of participants like yourselves to rate some of the tape's features for us.

In the low relevance condition, participants were told:

> The Psychology Department was asked to provide feedback about the sound quality of an audiotaped message. This audiotaped message was prepared by local high school students for possible use in a required psychology experiment. We are asking a group of participants like yourselves to rate some of the tape's features for us.

Manipulation of Repetition. Those in the no–repetition condition were then told that they would listen to the recording one time and then be asked to rate the tape's quality. They were then directed to put on the provided headphones,[1] press the play button of the cassette player, and

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1. One earpiece of the headphones was marked with a red dot. This earpiece was the "active channel" through which the message could be heard. Right–handed participants were instructed to put the earpiece with the red dot on their left ear, and left–handed participants were to put the marked earpiece on their right ear. This controlled for any impact of lateral organization on persuasiveness. Presentation of a persuasive message to the left cerebral hemisphere of right–handers appears to increase resistance to the message, whereas presentation to the right hemisphere decreases resistance (and vice versa for left–handers; Drake, 1991; Drake & Bingham, 1985).

listen closely to the message until they heard a "beep," which signaled that they should press the "stop" button of the cassette player.

Those in the repetition condition were told that they would be listening to the recording three times before being asked to rate the tape's quality because in the media broadcast (high relevance) or high school experiment (low relevance) individuals might be exposed to the message multiple times.[2] After they pressed the play button, they heard the same message three times, with approximately 2 seconds of silence between each presentation.

Manipulation of Argument Strength. Participants heard either a strong or a weak version of a message promoting the implementation of comprehensive exams.

Dependent Measures. We asked participants one item (as did Cacioppo & Petty, 1989) assessing their attitude about senior comprehensive exams (*UCSB should introduce comprehensive exams as an academic policy*). Participants were told that this was necessary "in order to control for possible attitudinal influences on the evaluation of the quality of the tape."

We next asked participants three questions reported in Cacioppo and Petty (1989), one about the tape's quality (*In my opinion, the sound quality of the audiotape is Very poor 1 ..9 Very good)* and two about the processing task *(How distracted did you feel while listening to the audiotape? Not at all 1 … 9 Very Much; How much mental effort did you expend thinking about the content of the message presented on the audiotape? None 1..9 Very Much).*

Participants were then asked two questions to assess the effectiveness of the relevance manipulation (*The issue discussed in the audiotaped message is personally important to me; I was highly motivated to pay close attention to the issue presented in the audiotaped message*), two questions assessing how strong and convincing the arguments were, and one item assessing how tired they felt. At this point, participants were debriefed, thanked, and dismissed.

RESULTS

Initial analysis confirmed that the pro-comprehensive exam message was counterattitudinal (initial attitude $M = 2.64$, on a 9–point scale).

Checks on the Effectiveness of Manipulations

Relevance. The two items assessing personal relevance and motivation were averaged ($\alpha = .76$). This index was subjected to a 2 (argument

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2. We wished to follow Cacioppo and Petty's (1989) methodology as closely as possible. They forewarned participants about whether they would hear the message once or multiple times, so we did also.

strength) $\times$ 2 (repetition) $\times$ 2 (relevance) between–subjects ANOVA. As expected, this analysis yielded a main effect of relevance, $F(1, 77) = 4.862$, $p = .03$. Those in the high-relevance condition believed the message to be more personally relevant ($M = 5.67$) than those in the low-relevance condition ($M = 4.82$). No other main effects or interactions were found.

Argument Strength. The two items assessing argument strength were averaged to form an argument strength index ($\alpha = .94$). The results of the ANOVA showed only a main effect of argument quality, $F(1,77) = 32.86$, $p < .001$. Those who read the message containing strong arguments believed it to be more compelling ($M = 6.08$) than those who read the message with the weak arguments ($M = 3.82$).

Attitude Change

Participants' initial (pre-message) attitudes about senior comprehensive exams were subtracted from the post-message attitude item to form an attitude–change score. This change score was subjected to a 2 (argument strength) $\times$ 2 (repetition) $\times$ 2 (relevance) $\times$ 2 (participant sex) between–subjects ANOVA. Participant sex was included because the gender composition of this sample was substantially unbalanced and because a preliminary analysis showed a marginal sex difference on pre-message attitudes toward senior comprehensive exams in this sample, $t(83) = 1.684$, $p = .096$; $M = 2.25$ (men) and $M = 2.82$ (women). The analysis of change scores yielded three statistically significant results. The first was a main effect of argument strength, $F(1, 69) = 23.78$, $p < .001$, showing that those who heard strong arguments were persuaded more ($M = 2.55$) than those who heard weak ones ($M = 0.38$). Secondly, there was an interaction between argument strength and participant sex, $F(1, 69) = 4.16$, $p = .045$. This interaction revealed that the argument strength manipulation was effective for both sexes, but stronger for men.

Most importantly, there was the predicted three–way interaction among repetition, argument strength, and relevance, $F(1, 69) = 10.50$, $p = .002$. We expected participants to process less analytically in the repetition condition than in the no–repetition condition when relevance was low. This prediction was supported. A planned contrast in the low-relevance condition (contrast weights: 1, –1, –1, 1) revealed a marginally significant two–way interaction between repetition and argument strength, $F(1, 69) = 3.58$, $p = .06$. As shown in Figure 1,[3] when the message

3. In Figure 1, it may appear that there is more analytic processing in the low–relevance, no–repetition condition than in the high–relevance, no–repetition condition. However, a post–hoc analysis on the no–repetition cells indicates that there is no interaction between relevance and argument strength, $F(1, 31) = 1.879$, $p = .180$.
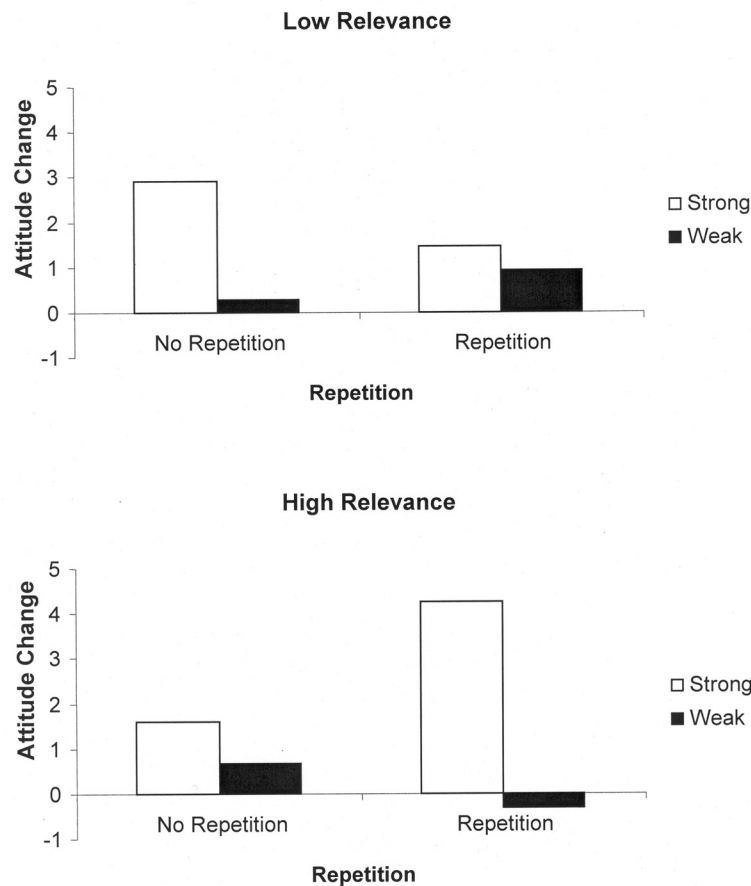
Low Relevance

High Relevance

FIGURE 1. Experiment 1: Attitude change as a function of relevance, repetition, and argument strength.

was heard only once, participants were more persuaded by strong compared to weak arguments, suggesting analytic processing [planned contrast, $F(1, 69) = 9.485$, $p = .003$]. However, when the message was heard three times, this effect disappeared [planned contrast, $F(1,69) = .5776$, $p = .45$].

When relevance was high, we expected to find more analytic processing of the message when it had been repeated, which is what we found. When relevance was high, a planned contrast (contrast weights: 1, –1, –1, 1) revealed a significant two–way interaction between repetition and ar-

gument strength, $F(1, 69) = 10.13$, $p = .002$. As shown in Figure 1, when the message was heard only once, there was no difference in attitude change between strong and weak versions of the message, indicating nonanalytic processing [planned contrast, $F(1, 69) = 1.331$, $p = .253$]. However, when the message was heard three times, participants did differentiate between strong and weak arguments, indicating analytic processing [planned contrast, $F(1, 69) = 30.122$, $p < .001$]. With each presentation of the message, participants were apparently able to attain "greater realization of the meaning, interconnections, and implications of the message arguments" as suggested by Cacioppo and Petty (1989, p. 4). Perhaps because the arguments were read to participants at a conversational pace and not studied at a slower rate, participants could not glean all of the implications of the arguments during the first exposure. Thus, more and more information was taken from the message with each presentation. This type of presentation format, therefore, may have provided the ideal circumstance to demonstrate that repetition can increase analytic processing when relevance is high.

Assessment of Fatigue

Because differences in the experimental demands of the task were confounded with repetition, we conducted a 2 (argument strength) × 2 (repetition) × 2 (relevance) between–subjects ANOVA on the question addressing feelings of tiredness to rule out fatigue as an alternative explanation for our findings. Those who heard the message three times may have experienced excessive fatigue or burnout, which could make it difficult to process analytically. Such fatigue could offer an alternative explanation for why we observed nonanalytic processing in the low relevance condition after repetition. However, there were no main effects or interactions on the measure assessing tiredness.

DISCUSSION

Experiment 1 provided initial confirmation that personal relevance plays an important role in determining the impact of message repetition on processing. As expected, when personal relevance was low, repetition triggered less analytic processing of the message compared to when the message was presented only once. This happened even when participants had plenty of opportunity to process and when they knew that the third repetition would be their last opportunity to process.

   Repetition had quite a different effect in the high relevance condition. When personal relevance was high, additional exposure to the message increased the persuasive impact of strong relative to weak arguments.

Thus, the results were nicely consistent with the idea that under conditions of low relevance, message repetition would result in less analytic processing than a single exposure to the message, whereas under conditions of high relevance, message repetition would produce more analytic processing than a single message exposure.

Experiment 2 was designed to provide even more compelling support for our interactional hypothesis involving relevance, repetition, and argument strength. First, we wanted to improve the manipulation of personal relevance. The check on the effectiveness of the relevance manipulation in Experiment 1 indicated that it was both effective and unconfounded with other manipulated factors. Nevertheless, the fact that it was derived from a procedure that Cacioppo and Petty (1989) assumed post hoc induced high relevance meant that the manipulation was not as precise as we would have liked. In Experiment 2, we used an extremely well validated personal relevance manipulation to provide an additional test of our hypotheses. We again predicted that relevance would significantly moderate the impact of repetition on message processing as indexed by attitude change.

Second, we wished to provide a test of our hypothesis under conditions in which message repetition was much more subtle. In Experiment 1, participants explicitly knew that they would hear the message one versus three times. Thus, in the repetition condition, they knew they would have the opportunity to process the message further after the first presentation. In Experiment 2, prior exposure to the message in the repetition conditions was more subtle and occurred in a manner that might have made careful processing of that first exposure difficult. All participants were then given equal and adequate opportunity to process the target message, allowing us to compare how this kind of repetition interacted with relevance to influence processing. We again predicted that when relevance was low, the familiarity induced even by subtle repetition would reduce analytic processing of a repeated message compared to when the message was heard only a single time. When relevance was high, we expected analytic processing to increase with repetition. However, given the restricted processing context of initial exposure, we expected this effect might be more muted than that found in Experiment 1. Remember, Cacioppo and Petty (1989) argue that additional exposures to a message afford more opportunities to scrutinize the merits of the message arguments, resulting in even greater differentiation of attitudes following strong and weak arguments, compared to a single exposure. If the message is not processed much at all on initial exposure (because its presentation is so subtle), then little is gleaned from the message originally. In other words, most of the message elaboration may take place on the second obvious exposure. So, those who were exposed to the message previously in this study may not demonstrate much more analytic

processing after the second (but first obvious) exposure to the message than those presented with only one (but obvious) exposure to the message.

Finally, we wished to provide some evidence for our claim that the change in analytic processing following repetition is mediated by familiarity. Providing evidence of mediation in this paradigm is difficult because inferences about analytic processing are made from a between–subjects comparison of persuasion following strong and weak arguments. Nevertheless, an argument can be made that persuasion derived from weak arguments can provide an index of analytic processing. Although strong arguments have heuristic as well as systematic features that might cause persuasion, any attempt to carefully evaluate weak arguments regularly and typically reduces their persuasive power. Thus, relative rejection or acceptance of weak arguments can index the relative occurrence of analytic or nonanalytic processing. Because of the subtle nature of prior exposure in this study as compared to Experiment 1, we expected variation in participants' perceptions of message familiarity in this experiment. Thus, in the low relevance conditions, where we expected repetition–induced familiarity to reduce analytic processing, we expected this variation to mediate the impact of message repetition on analytic processing as indexed by acceptance of weak arguments. Our expectations are not as clear in the high relevance conditions. Although we expect repetition to induce greater processing under these conditions, this effect is not necessarily mediated by perceived familiarity of the arguments, but more probably by increases in motivation that accompany the high relevance manipulation.

EXPERIMENT 2

METHOD

Participants

Seventy (39 male and 31 female) UCSB students received either money ($8–$10) or class credit for participation. Five seniors were excluded because their senior status nullified the relevance manipulation. Participants were randomly assigned to one of eight different conditions representing a 2 (argument strength: weak vs. strong) $\times$ 2 (personal relevance: low vs. high) $\times$ 2 (repetition: repetition vs. no–repetition) between–subjects factorial design.

Procedure
Instructions and Assessment of Initial Attitudes. Participants, in groups of one to six per session, were told that the experiment concerned the ef-

fects of carrying out multiple tasks at once and that all instructions would be presented at the appropriate time by the computer. Participants were then seated individually in separate booths, where IBM PCs presented further instructions and experimental materials. Participants again completed the demographic questions used in Experiment 1, provided their attitudes about several filler issues, and provided their attitude about the key issue of senior comprehensive exams (measured as in Experiment 1).

Presentation of Persuasive Messages, Manipulation of Repetition, and Manipulation of Argument Strength. Participants were then instructed to put on provided headphones to begin the portion of the experiment involving simultaneous tasks.[4] They were asked to read carefully a randomly assigned strong or weak version of a message on the computer screen arguing against imposing restrictions on industry to control acid rain. Simultaneously, they heard a "background" message presented over the headphones. Participants were told not to pay attention to the background message and to concentrate solely on the reading task.

Those in the no–repetition condition heard a background message arguing for an increase in road taxes, whereas those in the repetition condition heard a message arguing for the implementation of senior comprehensive exams. The strength of the background message was "matched" to the strength of the written message (i.e., participants either heard strong or weak versions of both background and written messages), and all messages were counter-attitudinal.

Then, to maintain the cover story that the experiment concerned performing simultaneous tasks, participants responded to three statements presented on successive screens, which assessed their attitudes toward acid rain on 9–point scales:

The government should impose controls on industry to help minimize the effect of acid rain in the US.

Increases in problems with acid rain in the US should not be blamed on the activities of industries operating in affected areas.

The government should require the installation of sulfur dioxide emissions control devices in factories operating in the US.

Manipulation of Personal Relevance. Participants were then informed that UCSB was undergoing academic re–evaluation and that the school was seeking recommendations for policy changes. Specifically, compre-

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4. Participants were again directed to put the active channel on their right ear if left–handed, and vice versa, as in Experiment 1.

hensive exams were being recommended as a requirement for graduation. Following the often–used methodology of Petty et al. (1981), those in the high relevance condition were informed that the exams would start the following year, making this issue personally relevant for them. In the low relevance condition, the exams would not go into effect for 10 years.

Presentation of Target Message. At this point, participants were instructed to read carefully a strong or weak message on the computer screen arguing for implementation of comprehensive exams. For participants in the repetition condition, this message was identical to the comprehensive exam message that was played over the headphones in the previous task. For participants in the no–repetition condition, this was their first exposure to the comprehensive exam message.

Dependent Measures. Following the comprehensive exam message, participants responded to several items presented on successive screens (using 9–point scales). The first three gauged participants' attitudes about comprehensive exams by asking their agreement with:

Comprehensive exams will really benefit our university.

UCSB should introduce comprehensive exams as an academic policy.

UCSB should establish a system of comprehensive examinations as a requirement for graduation.

Items designed to check the effectiveness of the manipulations followed. Three questions assessed the effectiveness of the repetition manipulation by asking about the familiarity of the arguments in the comprehensive exam message. Two questions then assessed the effectiveness of the manipulation of argument strength, asking how strong and convincing the arguments were. An additional question assessed the level of personal relevance felt by the participants about the proposed change in academic policies at UCSB. Once finished with these dependent measures, participants were debriefed, thanked, and dismissed.

RESULTS

To ensure that all participants actually read the message about comprehensive exams, reading times were recorded and examined. In the distribution of reading times, we observed two extremely short (outlying) values. Data from these two individuals were excluded from all analyses, which resulted in a final sample size of 63 (35 male and 28 female) participants.

Checks on the Effectiveness of Manipulations

Personal Relevance. The measure of personal relevance was subjected to a 2 (argument strength) $\times$ 2 (repetition) $\times$ 2 (relevance) between–subjects ANOVA. Confirming our manipulation, the analysis revealed a significant main effect of relevance, $F(1, 55) = 6.68$, $p = .012$. Those in the high relevance condition believed the message to be more personally relevant ($M = 7.05$) than those in the low relevance condition ($M = 5.40$). There was also a main effect of repetition such that people who had heard the message before found it more relevant ($M = 6.88$) than those who had not ($M = 5.57$), $F(1, 55) = 4.256$, $p = .044$. Importantly, there was no interaction between relevance and repetition, $F(1, 55) < 1$, $p = .45$. Those in the repetition condition found the message more personally relevant in the high ($M = 7.95$) than the low ($M = 5.81$) relevance condition, as did those in the no-repetition condition, $M = 6.15$ (high) and $M = 4.98$ (low). Although the effect of repetition on relevance was unanticipated, its presence does not pose an interpretational problem for our hypothesis. The higher relevance (which typically increases analytic processing) reported in the repetition condition works against rather than for that part of our prediction that claims that repetition results in reduced analytic processing in the low relevance condition.

Familiarity. The three items about familiarity of the comprehensive exam message were averaged to form a familiarity index ($\alpha = .77$). Confirming the effectiveness of the manipulation, a 2 (argument strength) $\times$ 2 (repetition) $\times$ 2 (relevance) ANOVA revealed a main effect of repetition, $F(1, 55) = 6.829$, $p = .012$. Those people who had heard the comprehensive exam message as "background noise" earlier in the experiment rated it as more familiar ($M = 4.81$) than those who had instead heard a message about road taxes ($M = 3.55$). No other main effects or interactions were found.

Argument Strength. We averaged the two items used to measure argument strength ($\alpha = .96$). Results from the same ANOVA revealed a main effect of argument strength, $F(1, 55) = 29.047$, $p < .001$. As expected, participants who read the strong version of the message found its arguments more compelling ($M = 5.96$) than those who read the weak version ($M = 3.37$). Additionally, the analysis revealed a main effect of relevance on argument strength, $F(1, 55) = 4.009$, $p = .05$. Those in the low relevance condition believed the arguments to be more compelling ($M = 5.15$) than those in the high relevance condition ($M = 4.19$). Importantly, there was no interaction between argument strength and relevance, $F(1, 55) < 1$, $p = .62$. Those in the low relevance condition found the strong version of the message more compelling ($M = 6.32$) than the weak ($M = 3.97$), as did those in the high relevance condition, $M = 5.60$ (strong), $M = 2.77$ (weak).

Attitude Change

The three items assessing attitudes about comprehensive exams were averaged ($\alpha = .92$). Participants' initial (pre-message) attitudes about senior comprehensive exams (which confirmed that the pro-comprehensive exam message was counterattitudinal, $M = 2.81$, on a 9–point scale) were subtracted from that average to attain a measure of attitude change. This score was subjected to a 2 (argument strength) $\times$ 2 (repetition) $\times$ 2 (relevance) between–subjects ANOVA. Results of the ANOVA showed two statistically significant effects. First, there was a main effect of argument strength, $F(1, 55) = 50.17$, $p < .001$, showing that the strong version of the message led to more attitude change ($M = 3.25$) than the weak version ($M = 0.25$).

More importantly, analyses revealed the predicted three–way interaction among argument strength, relevance, and repetition, $F(1, 55) = 4.331$, $p = .042$. In the low relevance condition, we expected that those in the repetition condition would process the message less analytically than those in the no–repetition condition. This prediction was confirmed. A planned contrast within the low relevance condition (contrast weights: 1, –1, –1, 1) revealed a two–way interaction between argument strength and repetition, $F(1, 55) = 4.97$, $p = .03$. As shown in Figure 2,[5] those in the no–repetition condition processed the message analytically, that is, showed more attitude change in response to strong than weak arguments [planned contrast, $F(1, 55) = 24.346$, $p < .001$]; however, those in the repetition condition did so only marginally [planned contrast, $F(1, 55) = 3.628$, $p = .061$].

In the high relevance condition, we expected those in the repetition condition to process the message more analytically than those in the no–repetition condition. A planned contrast within the high relevance condition (contrast weights: 1, –1, –1, 1) failed to reveal a two–way interaction between argument strength and repetition, $F(1, 55) < .57$, $p = .46$. As shown in Figure 2, participants in both the no–repetition and repetition conditions processed the message analytically, that is, they differentiated between strong and weak arguments [planned contrasts: $F(1, 55) = 11.114$, $p = .001$; $F(1, 55) = 15.31$, $p < .001$ respectively]. Directionally, the means followed predictions. The difference between strong and weak arguments was larger with repetition than without, but this small increase in analytic processing was not sufficient to yield a statistically significant interaction, perhaps because of the substantial analytic

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5. It may appear that there is more analytic processing in the low–relevance, no–repetition condition than the high–relevance, no–repetition condition. Again, however, this is not the case. There is no interaction between argument strength and relevance in the no–repetition condition, $F(1, 29) = 1.30$, $p = .264$.
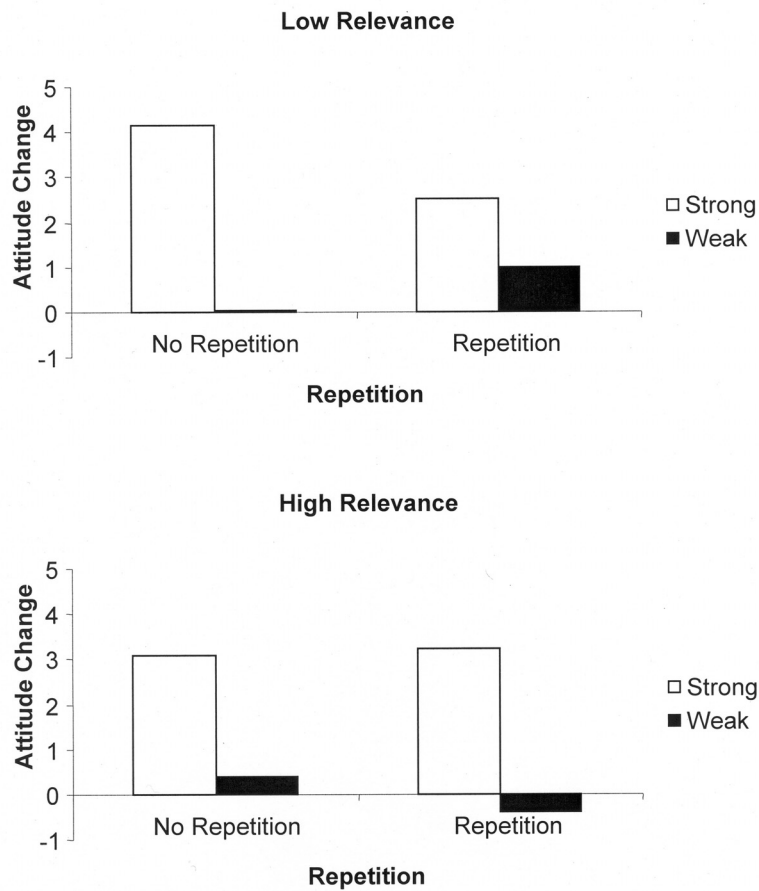
Low Relevance

High Relevance

FIGURE 2. Experiment 2: Attitude change as a function of relevance, repetition, and argument strength.

processing that already occurred under these circumstances in the no–repetition condition.

Mediational Analyses

We have suggested that the decrease in analytic processing observed in the low-relevance conditions is due to familiarity brought on by message repetition. In this section, we provide some mediational evidence that this is the case. In order to show that the effect of repetition on pro-

cessing is mediated by familiarity, we obviously need a measure of processing and familiarity from each participant. Traditionally, processing is determined by a between–subjects comparison of those who receive strong versus weak arguments. Thus, this traditional approach, which we followed in the current research, does not usually allow for mediational analyses. However, as stated earlier, we would like to argue that attitude change following weak arguments could be used as a within–subject measure of nonanalytic processing. Specifically, the more participants accept weak arguments, the less analytically they are processing.

Following the procedures recommended by Baron and Kenny (1986), we performed a series of regression analyses to demonstrate mediation of the effect of repetition on attitude change in the low relevance condition. First, we predicted attitude change from a dummy–coded variable representing repetition (0 = no repetition, 1 = repetition). Results revealed a significant relationship, $b = 1.00$, $t(16) = 2.41$, $p = .029$, such that those in the repetition condition were more persuaded by weak arguments than those in the no–repetition condition. Second, we predicted familiarity from the dummy–coded repetition variable. Results showed that those in the repetition condition found the arguments more familiar than those in the no–repetition condition, $b = 2.444$, $t(16) = 3.326$, $p = .004$. Third, we predicted attitude change from perceived familiarity. Results indicated that the more familiar the message, the more attitude change in response to weak arguments, $b = .375$, $t(16) = 4.386$, $p < .001$ Finally, we predicted attitude change from a model including both the dummy–coded repetition variable and familiarity. In this analysis, familiarity continued to predict attitude change, $b = .351$, $t(15) = 3.07$, $p = .008$. That is, the more familiar the persuasive message seemed, the more attitude change there was following weak arguments. However, repetition no longer predicted attitude change, $b = .141$, $t(15) = .322$, $p = .752$. The reduction in the significance of the relationship between repetition and attitude change was significant, Sobel = 2.259, $p = .024$. Taken together, the results of the mediational analysis show that in low relevance conditions, it is the perceived familiarity of message arguments, brought about through message repetition, that is responsible for the reduction in analytic processing.

In another series of regressions, we investigated familiarity as a potential mediator of the relationship between repetition and processing in the high relevance conditions. Specifically, we wanted to assess the role of familiarity in any increase in analytic processing under these conditions. However, the dummy–coded repetition variable did not predict attitude change following weak arguments, $b = -.764$, $t(12) = -0.777$, $p = .452$. In retrospect, this was not terribly surprising because analytic processing occurred in both the no–repetition and repetition conditions

when relevance was high in this experiment (i.e., acceptance of weak arguments did not change much with repetition). Thus, because there was no direct effect of repetition on attitude change in response to weak arguments in the high-relevance condition, we could not investigate perceived familiarity of the arguments as a possible mediator.

DISCUSSION

Experiment 2 provided additional confirmation that personal relevance plays an important role in determining the impact of message repetition on processing. As expected, when personal relevance was low, message repetition triggered less processing of the message than it had received when presented only a single time. This result replicated Garcia–Marques and Mackie's (2001) findings, and strengthened the reliability of the effect, given that the paradigm used here was not open to alternative explanations based on processing requirements. Recall that Garcia–Marques and Mackie's (2001) participants heard a background message only in the repetition condition, and thus the reduced processing evidenced in that condition may have resulted from greater fatigue, wear–out, or distraction. The simultaneous processing task was present in both the repetition and no–repetition conditions in the current experiment, as those in the no–repetition condition also heard a background message, yet repetition still yielded the predicted effect. Our replication of those earlier findings in the low relevance condition suggests that Garcia–Marques and Mackie's (2001) use of an only moderately important message may have contributed to repetition triggering less processing in that research. The results of the mediational analyses in the low relevance condition were particularly important theoretically. These results indicated that the greater the sense of familiarity induced by repetition, the greater the acceptance of weak arguments (which we used as an indicator of reduced analytic processing).

Repetition had quite a different effect in the high relevance condition. When personal relevance was high, participants engaged in analytic processing regardless of repetition. The strong message was more persuasive than the weak, and an additional exposure to the message did not increase this difference. This result is clearly consistent with our hypothesis that personal relevance plays an important role in determining the impact of message repetition on processing, although repetition did not actually increase analytic processing, as found in our Experiment 1 and previous research (Cacioppo & Petty, 1989). As noted, however, this may be because not much information was likely gleaned during initial presentation because participants were busy performing another task and not focused on processing the target message. Therefore, the second exposure to the message may have been participants' only real opportu-

nity to closely scrutinize the message. In addition, because there was a reasonably large difference between strong and weak arguments in the no–repetition/high relevance condition, it may have been difficult for repetition to *increase* that already large effect.

META–ANALYTIC SUMMARY

A meta–analytic summary was conducted to determine the magnitude and consistency of the effect sizes representing the predicted three–way interaction among relevance, repetition and argument quality. A three–way interaction is captured by a contrast with the following weights: –1, +1, +1, –1, +1, –1, –1, +1. The numerator of each effect size was computed by taking the average of the weighted cell means sharing a +1 weight minus the average of the weighted cell means sharing a –1 weight. This difference was divided by the pooled standard deviations from those cells, yielding the standardized difference, g. Statistical tests of the overall effect size and the homogeneity (consistency) of those effects were based on d, a standardized difference that corrects for sample size. Calculations were aided by DSTAT, a program designed for meta–analytic statistics (Johnson, 1989).

The effect sizes representing the three–way interaction were $d = .44$ (Experiment 1) and $d = .37$ (Experiment 2). The overall effect size ($d = .41$) was statistically different from zero, $z = 2.46$, $p = .01$, and the effects were statistically consistent, $Q(1) = 0.039$, $p = .84$. These results confirm the findings presented with each experiment—that there is a reliable and consistent interaction among personal relevance, repetition, and argument strength on persuasion.

Separate meta–analytic summaries were conducted to determine the magnitude and consistency of the effect sizes of the predicted interaction between repetition and argument strength within the low and high relevance conditions across the two experiments. The numerator of each effect size was calculated by taking the average of the weighted strong/no repetition and the weak/repetition means and subtracting the average of the weighted weak/no repetition and strong/repetition means, for each level of relevance separately. Effect sizes in the low relevance condition were $d = .233$ (Experiment 1) and $d = .773$ (Experiment 2). The overall effect size ($d = .45$) was statistically different from zero, $z = 1.967$, $p = .049$, and the effect sizes were statistically consistent, $Q(1) = 1.324$, $p = .25$. These results confirm that under conditions of low personal relevance, there was a reliable and consistent interaction between repetition and argument strength across the studies. As displayed in Figures 1 and 2, the pattern of this interaction shows that participants processed the persuasive message analytically when exposed to the message only once, but that this effect disappeared when the message was repeated.

Effect sizes in the high relevance condition were $d = -.696$ (Experiment 1) and $d = -.012$ (Experiment 2). The overall effect size ($d = -.39$) was not statistically different from zero, $z = -1.62$, $p = .106$, and the effect sizes were statistically consistent, $Q(1) = 1.957$, $p = .16$. These results suggest that the pattern of the interaction between repetition and argument quality found across the two studies was not reliable. Given the differences in processing circumstances that occurred in the two studies, however, it is probably inappropriate to conclude that this effect does not exist. The substantial increase in analytic processing with repetition found in Experiment 1 replicated the effect found by Cacioppo and Petty (1989) when we used a similar methodology. This suggests that repetition can increase analytic processing when relevance is high, at least under certain conditions.

GENERAL DISCUSSION

These two experiments confirm that personal relevance moderates the impact of message repetition on processing. Under conditions of low personal relevance, both experiments found that a familiar message was processed nonanalytically, replicating the results obtained by Garcia–Marques and Mackie (2001). However, under conditions of high personal relevance, repetition had a different effect on processing.

Including the two experiments reported by Garcia–Marques and Mackie (2001), there are now four separate experiments demonstrating that a sense of familiarity, evoked by message repetition, leads to nonanalytic processing. As suggested by work predominantly in the cognitive psychology literature, a match between current inputs and a memory representation engenders processing fluency, which is experienced as an implicit feeling of familiarity. This implicit sense signals that the current inputs may be responded to merely on the basis of previously stored information. Therefore, nonanalytic processing is appropriate.

These experiments are the first to provide some suggestive mediational evidence for the regulatory role of familiarity. Regression analyses on the data from the low relevance condition of Experiment 2 showed that the greater the perceived familiarity of the message, the less analytic processing performed on it. These analyses further bolster our contention that the sense of familiarity results in reduced analytic processing of *repeated* messages, regardless of how they were processed on initial exposure. It is possible, of course, that the target message is processed on initial presentation, and that reported attitude scores are the result of this initial processing plus any processing that occurs during the repetition exposure. Given the results, this possibility seems only to lend further support to the hypothesis. Reported attitudes under low

relevance conditions in both studies reflect a lack of analytic processing (attitudes in the strong and weak conditions do not differ). This could be because the first presentation of the message received nonanalytic processing and nothing occurred during repetition to change this (i.e., the repeated message was processed very nonanalytically). Or it could be because the message was analytically processed on its first presentation, and then non– analytic processing occurred during the second presentation, eliminating the argument quality main effect. In either case, the obtained pattern of results could come about only if the repeated message received nonanalytic processing. Both outcomes seem driven by some recognition that the message has been encountered before and thus does not require analytic processing under the circumstances. The regression analyses are consistent with the idea that it is this recognition that reduces processing.

Because the methodologies of the current studies were quite different, the finding that familiarity leads to nonanalytic processing under low–relevance conditions appears quite robust and is not likely an artifact of a particular procedure. The effect was obtained when one or two repetitions were used to induce a sense of familiarity; when familiarity was subtle (the message was played as "background noise") or blatant (the message played three times with no distraction); when repetition of the message was anticipated or not; when the target message was presented verbally (and processed at participants' own pace) or aurally (and not processed at their own pace); and when low personal relevance was induced by implying that the advocated program would affect their university, but not for 10 years, or not affect their university at all (i.e., would only be used in a high school psychology experiment).

In addition, the methodologies of these two studies differ in some important ways from those used by Garcia–Marques and Mackie (2001), further ruling out specific procedures as confounding variables. For example, Garcia–Marques and Mackie used a different target message (concerning imposing governmental regulations on businesses to control acid rain) than the current studies. So the fact that message repetition led to nonanalytic processing is not message specific. Furthermore, Garcia–Marques and Mackie (Experiment 1) had participants listen to a message multiple times with a specific (and different) processing goal in mind (e.g., evaluate the pitch of the speaker's voice) each time. After the message was played, participants made judgments relevant to the processing goal. Therefore, the multiple repetitions used by Garcia–Marques and Mackie (2001) were spaced, whereas the multiple repetitions used in Experiment 1 were massed. Thus, the effect that familiarity leads to nonanalytic processing does not appear to rely on massed or spaced presentations.

The current work suggests that the role of familiarity under high relevance conditions may be complex. Message repetition did boost analytic processing in Experiment 1 but did not do so in Experiment 2. If an increase in analytic processing is caused by additional opportunities to elaborate on the message content (Cacioppo & Petty, 1979, 1989), then any one (or a combination) of the methodological differences (discussed previously) across the two studies could account for the differences in the results. Clearly, however, our ability to replicate Cacioppo and Petty's (1989) results in Experiment 1 demonstrates that under the right motivational and capacity conditions, the repetition–induced reduction of analytic processing can be not only eliminated but also reversed.

We have argued that message repetition, to the extent that it induces a (perhaps implicit) sense of familiarity, triggers nonanalytic processing. How then might repetition interact with relevance to have the very different impacts on message processing demonstrated in the previous literature and now in our two studies? We consider two plausible possibilities. Message repetition (familiarity) may trigger *initial* nonanalytic processing regardless of relevance conditions, but its subsequent and ultimate impact (like that of many heuristic cues) may be contingent upon relevance (Chaiken, 1987; Chaiken et al., 1989). When participants encounter a repeated message, any resultant sense of familiarity triggers nonanalytic processing. Those in repetition conditions will thus typically process less analytically (and thus distinguish less between strong and weak arguments) than those in no–repetition conditions. When relevance is low, participants have no motivation or reason to further scrutinize the message more thoroughly, and their responses will parallel the typical case, showing less differentiation between strong and weak arguments. When personal relevance is high, however, the nonanalytic processing evoked by familiarity may be augmented or even supplanted by further analytic processing triggered by higher motivation. Under these circumstances, message repetition affords additional opportunities for elaboration. As a result, strong arguments may result in even greater attitude change, whereas weak arguments may result in even less change. From this perspective, then, repetition may act as a nonanalytic processing cue, the outcome of which may be overwhelmed by the result of other, more extensive processing.

Another possibility is that familiarity leads to nonanalytic processing regardless of personal relevance, but that the "familiarity threshold"—the number of repetitions necessary to induce a sense of familiarity and trigger nonanalytic processing—differs with relevance. When relevance is low, even the "gist" of a message may seem "close enough" to a memory trace, and familiarity may be induced and nonanalytic processing triggered. Under conditions of high personal relevance, however, the familiarity threshold may be raised. A message read under

high levels of personal relevance will receive careful scrutiny. A detailed and complex representation of the message is likely generated as a result. Perhaps a single or even a few additional exposures to that message may not create a match between the current input and a complex memory representation. This may in fact occur only after several repetitions. Thus, nonanalytic processing under high-relevance conditions might be observed, but only with a larger number of repetitions than used in the current experiments.

This view provides an interesting alternative interpretation of earlier relevant work. Although we have already described the "moderate repetition" condition of Cacioppo and Petty's (1979) study in which participants heard a pro– or counterattitudinal high–relevance message one or three times, the study also included a condition in which the message was heard five times. Their results indicated that with moderate repetition, agreement with the message increased, but with five repetitions, agreement declined. Their interpretation was that moderate repetition allowed for greater analytic processing, whereas excessive repetition led to tedium, reactance, and/or fatigue. Another possibility, however, is that with the higher levels of personal relevance and motivation in that study, higher levels of repetition were necessary before participants reached a "familiarity threshold" and nonanalytic processing began. Whether nonanalytic processing induced by numerous repetitions under high–relevance conditions is the result of tedium or familiarity can be resolved in future work.

These studies make important contributions in both theoretical and applied areas. First, they add to the small but growing literature addressing what factors influence processing–mode selection. The results suggest that an implicit sense of familiarity, brought about by message repetition, may trigger nonanalytic processing. Secondly, familiarity has been shown to lead to nonanalytic processing in numerous other domains, and the current work confirms that it plays a similar role in the processing of persuasive messages. In addition, this work resolves an apparent contradiction in the literature. Cacioppo and Petty's (1989) work suggested that familiarity increases analytic processing, whereas Garcia–Marques and Mackie's (2001) work suggested that familiarity decreases analytic processing. These two experiments suggest that familiarity leads to nonanalytic processing under conditions of low personal relevance but analytic processing under conditions of high personal relevance. Finally, this work also has substantial applied relevance. Message repetition is common in several domains, such as advertising and politics. This work suggests conditions under which that repetition may be more or less effective.

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