

Attitude Importance and the Accumulation of Attitude-Relevant Knowledge in Memory

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People who attach personal importance to an attitude are especially knowledgeable about the attitude object. This article tests an explanation for this relation: that importance causes the accumulation of knowledge by inspiring selective exposure to and selective elaboration of relevant information. Nine studies showed that (a) after watching televised debates between presidential candidates, viewers were better able to remember the statements made on policy issues on which they had more personally important attitudes; (b) importance motivated selective exposure and selective elaboration: Greater personal importance was associated with better memory for relevant information encountered under controlled laboratory conditions, and manipulations eliminating opportunities for selective exposure and selective elaboration eliminated the importance–memory accuracy relation; and (c) people do not use perceptions of their knowledge volume to infer how important an attitude is to them, but importance does cause knowledge accumulation.

Keywords: attitudes, attitude strength, memory, knowledge, selective exposure, selective elaboration

A centerpiece of human socialization and development is learning—the gathering of knowledge about how the world works. Such knowledge equips people to manage their existences: to enhance their acquisition of rewards; to minimize their experience of punishment; and in the extreme, to ensure their survival. But learning is not only of instrumental value—enlightenment is viewed by many scholars and philosophers as a source of intrinsic psychological satisfaction and fulfillment, rewarding in and of itself, regardless of whether it is used to manipulate day-to-day experiences. For example, Maslow (1999) spoke of the “sheer delight and satisfaction of knowledge and understanding per se. It makes

the person bigger, wiser, richer, stronger, more evolved, more mature. It represents the actualization of a human potentiality, the fulfillment of that human destiny foreshadowed by human possibilities” (pp. 74–75).

Given the importance of knowledge as an instrumental tool and as a source of material and psychic satisfaction, our focus in this article is on the forces that instigate and direct knowledge gathering. This is an especially important question in light of the inescapable reality that there is too much information available in the social world for any one perceiver to acquire and store it all in memory, so people must be selective in their learning. Maslow

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(1999) argued that “curiosity and exploration are ‘higher’ needs than safety” (p. 75), so people will not seek knowledge broadly unless they have satisfied lower (i.e., more basic) needs, such as security. However, other theories are needed to explain how people choose what to learn about and what knowledge to forgo after they have satisfied such lower needs.

One focus of social psychological research on knowledge acquisition has been on intrapsychic processes involving cognitive consistency (Festinger, 1957), and other work has focused on the impact of experiences that lead people to be exposed to information (Nie, Junn, & Stehlik-Barry, 1996; D. F. Roberts & Maccoby, 1985; Robinson & Levy, 1986; Wood, Rhodes, & Biek, 1995). The work in this article complements that work by adopting a perspective from the attitude-strength literature and considering the possibility that the personal importance of a person’s attitude toward an object may play an instigating role in knowledge acquisition.

Personal importance and the amount of information a person has about an object have both been recognized for some time as attributes related to the strength of the person’s attitude toward the object. The more importance a person attaches to an object and the more knowledge she or he has, the more likely the attitude is to be resistant to change, persistent over time, and influential in directing thinking and action (see Krosnick & Petty, 1995). And we have known for some time that importance and knowledge volume are positively correlated with one another (e.g., Bassili, 1996; Krosnick, Boninger, Chuang, Berent, & Carnot, 1993; Prislun, 1996; Visser, 1998). But we do not know why they are correlated with one another—that is, what gives rise to this association.

The principal hypothesis tested in this article is that importance instigates knowledge accumulation. We conducted a series of studies to examine whether attaching personal importance to an attitude leads people to learn more about the object of that attitude, and we explored two mechanisms of this effect: that personal importance may lead people to selectively expose themselves to attitude-relevant information and that once exposed to such information, personal importance may instigate people to process that information more deeply and richly, thereby facilitating later retrieval.

We begin below by reviewing past work on the causes of knowledge accumulation. Then we outline a set of hypotheses about how and why importance may instigate the accumulation of attitude-relevant knowledge, and we review existing evidence relevant to those hypotheses. Finally, we report the results of nine studies designed to test these hypotheses with a focus on a particular type of attitude: evaluations of government policies.

The Documented Causes of Knowledge Accumulation

Festinger (1957, pp. 127–129, 163) proposed that people experiencing cognitive dissonance may seek out information about an object in order to reduce the dissonance, particularly when there is reason to expect that information will be dissonance reducing. Festinger also proposed that people experiencing dissonance should be especially likely to avoid exposure to information they have reason to believe may be dissonance exacerbating. An absence of dissonance, Festinger claimed, should not motivate either active seeking out of information or active avoidance of information exposure. Thus, increasing levels of dissonance were thought to be associated with increased information seeking, especially of information likely to reduce the dissonance.

Remarkably little research has tested this hypothesis (though for related work, see, e.g., Adams, 1961; Frey & Wicklund, 1978; for a review, see Eagly & Chaiken, 1993). Instead, researchers have devoted much more effort to investigating a hypothesis that Festinger did not explicitly offer: that people prefer to expose themselves to information consonant with their own views, regardless of whether or not they are experiencing dissonance (see, e.g., Klapper, 1960). This seemingly plausible notion has met with a largely disappointing body of empirical evidence, revealing that people prefer exposing themselves to attitude-consistent information only under a specific set of circumstances (e.g., Frey, 1986; Jonas, Schulz-Hardt, Frey, & Thelen, 2001). Other studies have shown that de facto selective exposure also occurs, whereby people’s locations in the world bring them into contact with information primarily in line with their attitudes by coincidence, not as the result of active selectivity (see Freedman & Sears, 1965).

Additional work has explored variation in people’s retention of information to which they have been exposed. Some early studies suggested that people have a tendency to remember attitude-consistent information and to forget attitude-challenging information (e.g., Levine & Murphy, 1943; Watson & Hartmann, 1939), and an initial meta-analysis suggested this tendency was reliable but weak (J. V. Roberts, 1985). However, a later, more thorough meta-analysis showed that well-designed studies produced a near-zero “congeniality effect” (Eagly, Chen, Chaiken, & Shaw-Barnes, 1999), and Eagly, Kulesa, Brannon, Shaw, and Hutson-Comeaux (2000) showed that this is so because people devote a great deal of cognitive effort to thinking about attitude-inconsistent information (generating counterarguments), which makes this information as memorable as attitude-consistent information (which has other memorial advantages).

Beyond these literatures, all focused on notions of cognitive consistency, relatively little work has sought to identify the social psychological constructs that drive people to gather and retain information in their memories about particular objects and to forgo learning about others. Wood et al. (1995) noted that direct behavioral experience with an object enhances knowledge about it. Informal discussion with others about an object can educate a person (Robinson & Levy, 1986), as can exposure to information through formal schooling (Nie et al., 1996) and through the news media (D. F. Roberts & Maccoby, 1985). However, which psychological motivators instigate such information gathering has been left largely unanswered by past work.

New Hypotheses Regarding Attitude Importance and Knowledge

To outline our hypotheses about the relation of importance to knowledge accumulation, it is useful to begin with a general account of the processes by which information relevant to an attitude object is presumed to accumulate in memory (see, e.g., Atkinson & Shiffrin, 1968; Craik & Lockhart, 1972). Although learning can take place via automatic, unconscious processes (e.g., Berry, 1994; Stadler & Frensch, 1998), we propose that importance is likely to influence knowledge acquisition via a series of conscious steps. The first step is information exposure, during which a person encounters a piece of information in the social environment. Second, a perceiver devotes perceptual attention to that information, bringing it into short-term or working memory (Baddeley & Hitch, 1974). Amid the “buzzing, blooming confu-

sion" (W. James, 1890) that fills people's social environments, selective attention is a necessity. People are able to attend to multiple stimuli simultaneously (e.g., Treisman, 1964), but attention is not devoted to everything that a person encounters. Information that is unattended may be stored in long-term memory (e.g., Bornstein & D'Agostino, 1992), but information that attracts a person's attention and thereby makes its way into working memory has a memorial advantage in the long run.

Information in working memory that undergoes elaboration is likely to be encoded into long-term memory, where associative links are built, connecting new information to previously acquired information through elaborative rehearsal and other such mechanisms (Craik & Lockhart, 1972). The deeper the processing of this incoming information, the stronger the neural trace and the more likely it is to be available for later retrieval (e.g., Craik, 1977; Tyler, Hertel, McCallum, & Ellis, 1979).

When characterized in this fashion, it is clear that the process of accumulating knowledge is often a cognitively demanding one. It is also a process at which people are well practiced, and such practice no doubt makes the process relatively easy to implement (e.g., E. R. Smith, Branscombe, & Bormann, 1988). However, accumulation of knowledge appears to be at least in part a zero-sum game: The more a person is exposed to information about a particular object and the more resources she or he devotes to attending to that information and elaborating on its relation to other knowledge she or he already possesses, the less likely other available information is to be stored in long-term memory and available for later retrieval (e.g., Kahneman, 1973). Thus, which information makes its way into long-term memory via selective exposure and elaboration seems likely to be a function of people's motives and desires.

Dissonance theory points to some motives that may be consequential in this context. To maintain intrapsychic harmony, people may sometimes prefer to encounter information that is consistent with their beliefs and to avoid or discard information that challenges their beliefs. This account treats memory as an end in itself, as a repository of facts that can make a person either happy or uncomfortable simply by their existence. However, memory can also be thought of as a tool bag, filled with items that can allow a person to navigate effectively through the social environment. Therefore, information acquisition may be inspired by more proactive desires to understand and control pieces of the social world.

Another possible motive is suggested by the positive correlation between the amount of knowledge a person possesses about an object and the personal importance of the person's attitude toward the object. People describe themselves as more knowledgeable about an object when their attitudes toward it are more important to them (e.g., Bassili, 1996; Krosnick et al., 1993; Prislun, 1996; Visser, 1998). People for whom an attitude is more important are in fact able to retrieve more information about the attitude object from memory (Berent & Krosnick, 1995; Krosnick et al., 1993; Wood, 1982), and the knowledge accompanying more important attitudes appears to be unusually accurate (Krosnick, 1990).

These associations may be due to the role of attitude importance as a motivator of information acquisition and retention. Attitude importance is a subjective judgment—a person's sense of the concern, caring, and significance she or he attaches to an attitude (see Boninger, Krosnick, Berent, & Fabrigar, 1995). Perceiving an attitude to be personally important leads people to use it in processing information, making decisions, and taking action (for a

review, see Boninger, Krosnick, Berent, & Fabrigar, 1995). If attaching importance to an attitude motivates people to use the attitude in these ways as guides for thinking and action, then having a substantial amount of knowledge about the attitude object seems likely to be quite useful to facilitate effective attitude use. Consequently, attitude importance may motivate the acquisition of relevant knowledge in long-term memory by creating what Burnkrant (1976) called "need for information" and what W. James (1890) called "voluntary attention."

This general attention-focusing motive may manifest itself in a number of ways. First, attitude importance may help determine to which information in a person's environment he or she attends. People may prefer to encounter information relevant to their more important attitudes, a preference that seems particularly likely to influence information gathering when information about multiple topics is available and when cognitive resources or time are limited, so individuals are not able to attend to all information available in their environments. Furthermore, this sort of selective exposure seems most likely to occur when information is labeled by cues that facilitate selectivity (e.g., newspaper headlines).

Once exposed to information, people probably process it more deeply if it is relevant to more important attitudes, again because such processing is likely to serve strategic purposes later. So this new information is more likely to be encoded and stored in long-term memory, and associative links between the new information and information already stored in memory are more likely to be established in the process. Because greater linkage facilitates retrieval of information from memory (e.g., Raaijmakers & Shiffrin, 1981), people may be better able to remember information relevant to more important attitudes. Selective elaboration and the resulting increase in probability of retention are only likely to occur, though, when people have the requisite resources (e.g., cognitive capacity, time). When these resources are limited, elaborative processing is not possible, even if the relevant attitude is very important.

Taken together with previous research on the origins of importance and knowledge, our hypotheses about these constructs in the context of governmental policies can be summarized by the diagram in Figure 1. A person presumably comes to attach personal importance to an attitude either because his or her own material interests are at stake, because people with whom he or she identifies are materially affected by the object or consider their attitudes toward the object to be important, or because the object is perceived to be relevant to his or her values (see Boninger, Krosnick, & Berent, 1995). Importance is thought to inspire selective exposure to and intensive elaboration of information relevant to the attitude object, which each increase the likelihood that a person will accumulate a large volume of information about the attitude object.

Shown at the bottom left of the figure is a previously established cause of knowledge volume in the political domain: nonselective exposure to news coverage of political events (see Delli Carpini & Keeter, 1997; D. F. Roberts & Maccoby, 1985). The flowing nature of TV and radio news programs does not easily afford viewers and listeners opportunities to choose to watch or hear some stories and not others. Therefore, choosing to watch or hear such programs probably brings with it nonselective exposure to information on many topics. Attitude importance is not the sole determinant of knowledge accumulation but rather presumably instigates a set of supplementary topic-specific processes.

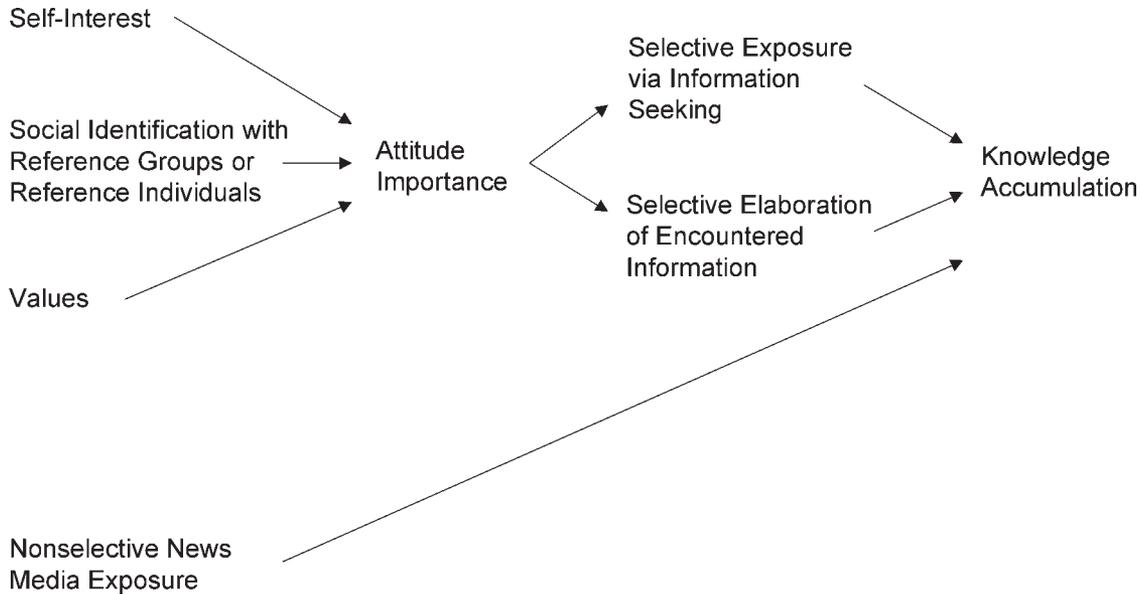


Figure 1. Diagram of hypotheses.

Overview of the Present Studies

The nine studies we report in this article test the hypothesis that attitude importance yields better memory for attitude-relevant information because of selective exposure to and selective elaboration of such information. These studies combine the virtues of “everyday” memory research done in the field with the virtues of tightly controlled laboratory studies (see, e.g., Banaji & Crowder, 1989; Neisser, 1988).

Our first study tested whether there is a relation between attitude importance and memory for attitude-relevant information acquired naturally during daily life. Participants were interviewed before and after they watched a televised presidential debate in their own homes under natural conditions, and we assessed whether memory for statements made during the debate was related to the importance of relevant attitudes. Our second, third, and fourth studies tested whether attitude importance inspires selective exposure to and selective elaboration of attitude-relevant information. Studies 2 and 3 used laboratory data to test these hypotheses directly. Study 4 used longitudinal survey data to test the direction(s) of the causal relation(s) between importance and selective elaboration. Studies 5–8 were conducted under controlled laboratory conditions using stimuli explicitly designed for experimental purposes. In these studies, we tested the mechanism(s) responsible for the effects of attitude importance on memory by manipulating participants’ ability to selectively expose themselves to or selectively elaborate on information. Study 9 used structural equation modeling to test whether importance causes knowledge accumulation and whether people infer attitude importance by observing the amount of information they have about an attitude object.

Study 1

Study 1 explored whether greater importance is associated with naturally occurring knowledge volume increases outside the laboratory in a general public sample.

Method

Participants

A random digit dialing sample (Waksberg, 1978) of adult residents of the Columbus, Ohio, metropolitan area was interviewed by telephone by nine trained and carefully supervised interviewers. Initial interviews were conducted the evening before the October 13, 1988, U.S. presidential debate between George H. W. Bush and Michael Dukakis. A total of 134 participants were contacted and answered questions about their candidate preferences and political ideology. Sixty-three of these participants (47%) were successfully reinterviewed the day after the debate.

Recontact Interview

During the debate, the candidates made enough statements of their positions to permit construction of recognition memory measures on only three issues: taxes, capital punishment, and defense spending. Each candidate made two statements about taxes, one about capital punishment, and three about defense spending. Statements from President Bush reflected conservative positions (opposition to raising taxes, support for capital punishment, and support for increased defense spending), and statements from Governor Dukakis reflected liberal positions on two issues (opposition to capital punishment and opposition to increased defense spending), and a conservative position on the third (opposing tax increases). During the follow-up interviews, participants completed cued recall and recognition memory tasks focused on those issues, reported their attitudes on the issues, reported the personal importance of those attitudes, and completed a six-item political knowledge quiz.

For the cued recall task, participants were first asked whether they remembered hearing any discussion about each of the target issues during the debate. Participants who indicated that they remembered discussion of an issue were asked to list the statements they could recall either candidate making about the issue. Participants’ verbal protocols were tape-recorded and were then transcribed immediately following each interview.

For the recognition memory task, interviewers read 24 statements on the three target issues. Twelve of these statements (*old* statements) had been made by the candidates during the debate, and the other 12 (*new* statements) had not. After listening to each statement, participants indicated

whether or not they thought it had been made by one of the candidates during the debate.

The 12 old statements made by the candidates during the debate were clear expressions of their attitudes toward policies on each of the three target issues. Two statements on each issue made by each candidate were used, and the statements were roughly equal in length. Each of the 12 new statements used in the recognition memory task corresponded to a specific old statement. Each new statement was constructed to be similar in length to its corresponding old statement and to express a similar attitude.

Measures

Attitude importance. Participants indicated how important each issue was to them personally and how much they personally cared about each issue. Responses to each question were coded to range from 0 to 1 (with larger numbers indicating greater importance). The two items were averaged to yield a single attitude importance index for each issue.

Memory accuracy. Measures of memory accuracy were computed for each participant on each issue. First, cued recall accuracy measures were computed on the basis of participants' recollections of the statements made during the debate. Two independent coders assessed the number of correct recollections for each participant on each issue, and the two coders' results were averaged to yield a single cued recall accuracy score for each participant on each issue. Correlations between the two coders' results were .95 for taxes, .94 for capital punishment, and .94 for defense spending.

Recognition memory performance was assessed through the most widely used statistic for this purpose: d' , which used a participant's *hit* rate (i.e., the rate at which he or she correctly identified statements that were made by one of the candidates during the debate as such) and his or her *false alarm* rate (i.e., the rate at which he or she incorrectly claimed that new statements had been made during the debate) to gauge accuracy of recognition on each issue (Green & Swets, 1966). The d' statistic is the difference between these two rates divided by the standard deviation of responses to the new statements. The highest possible hit rate and the lowest possible false alarm rate indicate the most accurate recognition. In our case, d' was computed separately for each issue and could range from +2 to -2, with +2 indicating perfect discrimination between old and new statements, 0 indicating chance levels of discrimination, and negative numbers indicating more false alarms than hits.¹

Attitudes. Participants were asked to report their attitudes on rating scales with labeled endpoints. Responses were coded to range from 0 to 1, with higher numbers indicating more liberal positions.

Analysis

Although recognition and recall involve different memory processes (e.g., Rabinowitz, Mandler, & Patterson, 1977), we had no a priori reasons to expect that they would be affected differentially by importance. Therefore, we estimated the parameters of a single multilevel model using MLwiN (Rabash et al., 2000; see Kreft & de Leeuw, 1998) in which recognition d' and recall were treated as indicators of memory accuracy. Multilevel modeling was used because the data were hierarchically structured: Each participant provided recall and recognition scores for each issue, issue was nested within participant, and measure was nested within issue. In the multilevel model, measure (cued recall or recognition) was treated as Level 1, issue (taxes, capital punishment, and defense spending) was treated as Level 2, and participant was treated as Level 3. This approach allowed us to estimate the impact of importance on memory accuracy as we would in a conventional ordinary least squares (OLS) regression across issues and measures while explicitly modeling the multilevel nature of the data. We report unstandardized regression coefficients and standard errors that are analogous to such parameter estimates from OLS regressions.

Parameters representing the slopes and intercepts for each issue and memory measure were estimated using dummy variables representing the

three issues and two measures. For each issue, an average intercept was estimated across individuals. Intercept differences across individuals were modeled as Level 3 residuals. The individual-level residuals for cued recall and recognition for each issue were allowed to covary. The intercepts represented the amount of memory accuracy among people for whom the importance of the issue was zero. We had no a priori theoretical reason to believe that these intercepts would be the same across issues and measures, because the particular stimulus sentences used may have varied in inherent memorability for a variety of reasons across issues and measures, independent of importance. We tested whether the intercepts for the importance–memory accuracy relation differed across issues and across measures by comparing the fit of a model in which all intercepts were constrained to be equal to the fit of a model in which the intercepts were allowed to vary across issues and measures. If imposing the equality constraint significantly compromised goodness of fit, then we allowed the intercepts to vary. Otherwise, we constrained the intercepts to be equal for the sake of parsimony.

Our analytic approach also allowed the slope of the importance–memory accuracy relation to differ across issues and measures. Again for the sake of parsimony, we initially estimated the importance–memory accuracy relation by constraining the slope to be equal across issues and measures. Although we had no a priori expectation of variation in this slope across issues and measures, we then tested whether the slope did in fact differ across issues and measures.

Because this analytic approach required that cued recall and recognition memory accuracy scores be in the same metric, we standardized scores on each memory accuracy measure for each issue. That is, a participant's cued recall score for taxes was converted to a z score with respect to all participants' cued recall scores for taxes. Similarly, recognition memory accuracy scores for taxes were standardized with respect to all taxes recognition memory scores. Thus, each participant generated six standardized memory accuracy scores (a cued recall and recognition memory accuracy score for each of the three issues).

Results

Importance–Memory Accuracy Relation

As expected, importance had a positive and significant effect on memory accuracy ($b = .46$, $SE = .23$, $p < .05$, $N = 366$).² Thus, participants for whom an attitude was more important were more likely to recall and recognize the statements relevant to that attitude. To illustrate, participants whose attitude importance ratings were below the median had lower memory scores on average ($M = -.09$) than did participants whose importance ratings were above the median ($M = .07$).

¹ The computation of d' involves converting proportions into z scores, so d' is indeterminate when a proportion is either 0 or 1. In our analyses, proportions of 0 were changed to .0228 (which translates to a z score of -2.00), and proportions of 1 were changed to .9772 (z score of 2.00).

² One-tailed p values are reported for all tests of directional hypotheses when the observed direction of an effect was as expected, and two-tailed p values are reported for tests of nondirectional hypotheses and tests of directional hypotheses when the observed difference ran in the direction opposite to expectations. Each N reported for multilevel analyses is the number of observations used to estimate a parameter: the number of participants multiplied by the number of issues and the number of memory accuracy measures for each issue minus any missing data points. These N s are appropriate for the multilevel models because they take into account the hierarchical organization of the data.

Differences Across Issues and Memory Measures

The fit of the model reported here was not improved significantly when the intercept of the importance–memory accuracy relation was allowed to vary across issues and memory accuracy measures, $\Delta\chi^2(5, N = 366) = .15, ns$, or when the slope of the relation of importance to memory accuracy was allowed to vary across issues and memory accuracy measures, $\Delta\chi^2(5, N = 366) = .70, ns$, suggesting that the effect of importance on memory did not differ across issues or measures.

Attitudes

We also tested whether people remembered statements expressing attitudes with which they agreed better than statements expressing attitudes with which they disagreed. For each issue and memory accuracy measure for each participant, we subtracted the memory accuracy score for statements expressing conservative positions from the memory accuracy score for statements expressing liberal positions. Multilevel modeling showed that participants' attitudes were not associated with this measure ($b = .08, SE = .18, ns, N = 359$). When a main effect of importance and an interaction between importance and attitudes were included as predictors of memory bias, the nonsignificant interaction ($b = -.32, SE = .71, ns, N = 359$) suggested that attitude-driven memory bias did not appear at any level of importance.³

Political Knowledge

The effect of importance on memory accuracy was unaffected by controlling for political knowledge ($b = .89, SE = .36, p < .05, N = 354$), nor did the impact of importance differ across levels of political knowledge (Political Knowledge \times Importance interaction: $b = -.87, SE = .63, ns, N = 354$).

Study 2

We hypothesized that the relation between importance and memory accuracy observed in Study 1 was in part due to selective exposure. Over the course of a 90-min debate, people may pay close attention to the candidates' statements on some issues but turn their attention elsewhere when other issues are discussed, and attitude importance may guide this selective attention. Study 2 was designed to test this hypothesis directly: that people seek more exposure to information relevant to more important attitudes. In this study, participants were given the opportunity to learn about a set of fictional political candidates by reading the statements they had purportedly made on various policy issues, with the expectation that participants' evaluations of the candidates would later be requested. The selective exposure hypothesis predicted that participants would request more information relevant to attitudes they considered more personally important.

Method

Participants

Two hundred two undergraduates at The Ohio State University participated in this study in partial fulfillment of an introductory course requirement.

Procedure

Participants completed self-administered questionnaires in groups of 12 to 20. Participants were told that they would be evaluating political candidates

after reading statements they made. After completing questions to gauge which information they wished to receive, they were debriefed and dismissed.

Questionnaire

Information choice was made using a 12×12 matrix. Twelve candidates, represented by the letters *A* through *L*, were listed across the top of the matrix, and 12 issues were listed down the left side: abortion, the death penalty for convicted murderers, gun control, defense spending, nuclear energy, sending U.S. troops to Saudi Arabia to oppose Iraq's invasion of Kuwait, laws to prevent pollution by industry, mandatory recycling, import restrictions, legalization of marijuana, women's rights, and busing to achieve racial integration. The instructions explained to participants that they would later be evaluating the candidates on the basis of information about their stands on policy issues. Participants were told that they could not receive all available information but rather could learn about only three issues for each candidate, which participants selected by placing check marks in the appropriate cells of the matrix. Six cells in each column contained an *X*, indicating that participants could not select those issues for that particular candidate. Each issue was available to be selected for 6 of the 12 candidates, such that each issue competed with each other issue for at least 2 candidates and not more than 4.⁴ After completing the matrix selection task, participants reported the personal importance of their attitudes on the 12 issues.

Measures

Attitude importance. Participants reported how important each issue was to them personally. Responses were coded to range from 0 to 1 (higher numbers indicated greater importance).

Selective exposure. The number of times each participant selected each issue during the exposure selection task was calculated.⁵ This variable could range from 0 to 6 for each issue.

Attitudes. Participants indicated the extent to which they agreed or disagreed with various policy positions. Responses were coded to range from 0 to 1 (larger numbers indicated more liberal positions).

³ We also tested the interaction between importance and attitudes. This interaction was positive and significant ($b = 2.14, SE = .70, p < .05, N = 366$), suggesting that individuals who advocated liberal positions showed a stronger importance–memory accuracy relation than did individuals who advocated more conservative positions. However, later studies did not replicate this interaction.

⁴ Participants were randomly assigned to be told the political party affiliation of each candidate or not. The results were similar regardless of whether the candidates' party identifications were shown or not, so we report results combining all participants. The issues made available for each candidate were determined using the following rules: (a) Each issue was available for selection six times; (b) each candidate had 6 of the 12 issues available for selection; (c) each pattern of available issues occurred for two candidates; (d) given the six available patterns of issues available for selection, the number of different issue combinations was maximized; (e) no 2 issues were both available for selection more than four times in the matrix; and (f) four pairs of issues were never simultaneously available for selection in the matrix (death penalty and mandatory recycling; defense spending and import restrictions; Kuwait and women's rights; pollution laws and recycling). The fact that some pairs of available issues appeared more than twice and other pairs never appeared was necessary given that only six unique combinations of available issues were used.

⁵ Several participants selected more than three issues or fewer than three issues for at least one of the candidates. In order to use the majority of the data without compromising its integrity, we chose to include in our analyses all participants who made such an error for two candidates at most. This approach led us to include 195 participants and to exclude 7. When we repeated the analyses using only the 129 participants who selected three issues for each candidate, we obtained comparable results.

Results

Importance–Selective Exposure Relation

In a multilevel regression analysis treating issues as nested within participants, importance had the expected positive and significant effect on selective exposure ($b = 2.84$, $SE = .14$, $p < .001$, $N = 2419$). Participants below the median in attitude importance chose an issue on an average of 36% of the occasions on which they could, whereas participants above the median chose the issue on an average of 66% of those occasions.

Differences Across Issues

The fit of these models was significantly improved when the intercepts of the importance–exposure relation were allowed to vary across issues, $\Delta\chi^2(11, N = 2,419) = 427.04$, $p < .001$, and when the effect of importance was allowed to vary across issues than when the effect of importance was constrained to be equal across issues, $\Delta\chi^2(11, N = 2,419) = 496.46$, $p < .001$. In a model where intercepts and slopes were allowed to vary across issues, the effect of importance on selective exposure was positive and statistically significant for all 12 of the issues but varied in strength.

Study 3

In our third study, we again tested whether importance was associated with selective exposure. In addition, we tested directly whether importance was associated with selective elaboration. We also tested whether the effect of importance on selective exposure and selective elaboration appears when controlling for other features of attitudes related to their strength. Strength-related attitude features such as extremity, certainty, and accessibility are usually positively related to one another (Krosnick & Petty, 1995), and the impact of importance we observed in Studies 1 and 2 might therefore be a reflection of these other related attitude features. Study 3 allowed us to gauge the impact of importance on selective exposure and selective elaboration controlling for the extremity, certainty, and accessibility of the attitude involved, as well as other characteristics of participants that might be related to memory accuracy (e.g., gender, identification with political parties, and liberal/conservative ideology).

Method

Participants

Six hundred fifty-four undergraduates at The Ohio State University participated in this study in partial fulfillment of an introductory course requirement.

Procedure

Participants visited our laboratory for about an hour in groups of 5 to 15, and each completed a questionnaire on a computer in a private room.

Questionnaire

Participants were given a list of seven issues and were told they would have 5 min to think about any or all of the issues. Participants then reported the issues they chose to think about and the order in which they thought about the issues. Participants also ranked a series of topics to indicate which they would most and least like to learn about, and they reported their

gender, political party identification, and liberal/conservative ideology. Then, participants were randomly assigned to answer a series of questions (which referred to the participants' "target issue") about either abortion or capital punishment. Participants reported their attitudes on the issue, and response latencies for each of these attitude reports were measured. Participants also reported attitude importance and attitude certainty.

Measures

Attitude importance. Participants indicated how important their target issue was to them personally, how much they personally cared about the issue, and how important the issue was to them relative to other issues. Responses were coded to range from 0 to 1, with larger numbers indicating more importance. The three measures were then averaged to create an index of importance.

Selective exposure. Three questions, each presenting a menu of three topics of information, asked participants to indicate which they would most and least like to learn about. Each list included one piece of information relevant to the target issue. For each list, participants were coded 1 if they said they most wanted to learn about the target issue, 0 if they said they least wanted to learn about the target issue, and .5 otherwise. These three measures were then averaged to create an index of selective exposure.

Selective elaboration. Selective elaboration was coded 1 for participants who thought about the target issue (either abortion or capital punishment) first, .86 for participants who thought about the issue second, .71 for participants who thought about it third, .57 for participants who thought about it fourth, .43 for participants who thought about it fifth, .29 for participants who thought about it sixth, .14 for participants who thought about it seventh, and 0 for participants who did not think about the target issue.

Attitude valence. Four sets of branching questions were used to assess participants' attitudes on their target issue. For example, participants were asked whether they favored legalized abortion, opposed it, or neither favored nor opposed it. Follow-up questions determined whether participants who favored or opposed legalized abortion did so strongly or somewhat, and whether participants who neither favored nor opposed it leaned toward one of these positions. Responses to each set of branching questions were used to construct 7-point scales, coded to range from 0 to 1 (with larger numbers indicating more positive attitudes) and were averaged to create an attitude index for each participant's target issue. Participants with an index score greater than .5 were coded 1 for the variable "positive attitude," and all other participants were coded 0. Participants with an attitude index score less than .5 were coded 1 for the variable "negative attitude," and all other participants were coded 0. Participants with an attitude score of .5 were coded 0 for both these variables and therefore served as the baseline group.

Attitude extremity. Attitude extremity was measured by folding each of the four target attitude rating scales at its midpoint and coding responses to range from 0 to 1, with larger numbers representing greater extremity. These scores were then averaged to yield an index of extremity.

Attitude certainty. Participants reported how confident they were about their opinions on their target issue and how sure they were that their opinions were correct. They also indicated how confident they were about the issue relative to other issues. Responses were coded to range from 0 to 1 (with larger numbers indicating greater certainty) and averaged to create an index of attitude certainty.

Attitude accessibility. Attitude accessibility was assessed via response latencies for the four target attitude questions, which were subjected to a reciprocal transformation (see Fazio, 1990). Response latencies for two other questions were subjected to reciprocal transformations and averaged to yield an index of baseline speed of responding. This index was subtracted from each of the reciprocalized attitude response latencies, and the results were averaged (larger numbers indicated greater attitude accessibility).

Gender. Women were coded 0, and men were coded 1.

Party identification. Participants indicated whether they considered themselves to be Democrats, Republicans, or something else. Follow-up questions determined whether partisans identified strongly or weakly with their party and whether those who did not identify with a party leaned toward one of the two parties. Responses were used to construct 7-point scales and coded to range from 0 to 1, with larger numbers indicating stronger identification with the Republican Party, smaller numbers indicating stronger identification with the Democratic Party, and .5 representing no identification with either of the two major political parties.

Liberal/conservative ideology. Participants indicated whether their political views were liberal, conservative, or moderate. Follow-up questions determined the degree of liberalism/conservatism (e.g., whether liberal participants described their views as very liberal or somewhat liberal) and the tendency of moderates to lean in a liberal or conservative direction. Responses were used to construct 7-point scales and coded to range from 0 for strong conservatives to 1 for strong liberals.

Results

Effects of Importance

Selective exposure. Two OLS regressions were conducted to assess the impact of importance on selective exposure and selective elaboration, controlling for attitude valence, attitude extremity, attitude certainty, attitude accessibility, gender, party identification, and liberal/conservative ideology (see Table 1). The positive and significant relation between importance and selective exposure (see row 1 of the "Selective exposure" column: $b = .29$, $SE = .06$, $p < .01$, $N = 550$) indicates that greater attitude importance led participants to choose to learn attitude-relevant information more. Participants who were above the median in attitude importance said they most wanted to learn attitude-relevant information in 56% of the choices on average ($M = .70$). Participants who were below the median in attitude importance most wanted to learn attitude-relevant information in only 39% of their choices on average ($M = .56$).

Selective elaboration. A positive and significant relation also appeared between importance and selective elaboration (see row 1 of the "Selective elaboration" column: $b = .22$, $SE = .06$, $p < .01$, $N = 533$), indicating that greater attitude importance was associ-

ated with a greater inclination to think about the issue. Participants who were above the median in attitude importance were more than twice as likely (34.5%, $M = .74$) to think about the issue first than were participants who were below the median (15.9%, $M = .65$).

Other Strength-Related Attitude Features

Attitude extremity and attitude accessibility did not predict selective exposure or selective elaboration (see rows 3 and 4 of Table 1). Certainty did not predict selective exposure ($b = .09$, $SE = .06$, ns , $N = 550$; see row 2 of Table 1), but greater certainty predicted more selective elaboration ($b = .13$, $SE = .06$, $p < .05$, $N = 533$).

Study 4

To provide more direct evidence that importance causes selective elaboration, Study 4 used longitudinal survey data to gauge the impact of importance on selective elaboration and vice versa while controlling for other strength-related attitude features, attitude valence, general political dispositions, and demographics. For this survey, a nationally representative sample of American adults was interviewed twice, immediately before the 1997 national debate about global warming and immediately afterward. Because the relevant constructs were measured identically during both interviews, we were able to implement a well-established analytic technique for generating evidence of causal influence.

The logic underlying this approach was articulated by Granger (1969), who argued that if one variable causes another, then measurements of the first variable made at one point in time should predict subsequent changes in the second variable. This logic has been outlined in many methodology textbooks (e.g., Duncan, 1975; Kenny, 1979; Kessler & Greenberg, 1981) and has been used to test causal claims in many past investigations (e.g., Bizer & Krosnick, 2001; Kessler & Greenberg, 1981; Krosnick, 1990).

We implemented this approach by estimating the parameters of a set of multiple regression equations, the conceptual core of which is shown graphically in Figure 2. This model proposes that attitude importance measured at Time 1 may have been a cause of attitude importance measured at Time 2 and that selective elaboration of attitude-relevant information measured at Time 1 may have been a cause of selective elaboration of attitude-relevant information at Time 2. After controlling for the stability of these constructs in this fashion, the only variance left unexplained in the Time 2 measurements is any change that occurred in these constructs between Time 1 and Time 2. Therefore, the effect of each variable measured at Time 1 on the other variable measured at Time 2 identifies the amount of change that occurred in the second variable that was predictable by prior levels of the first variable. If such a lagged effect appears, it is consistent with the hypothesis that the first variable caused changes in the second (see Kenny, 1979; Kessler & Greenberg, 1981). The model we estimated also included other Time 1 control variables, including attitude valence and extremity, attitude certainty, liberal/conservative ideology, general political knowledge, and various demographic characteristics.

Method

Participants

Computer-assisted telephone interviews were conducted with a representative sample of 688 American adults (selected via random digit dial-

Table 1
Unstandardized Ordinary Least Squares Regression Coefficients From Analyses Predicting Selective Exposure and Selective Elaboration (Study 3)

Predictor	Dependent variable			
	Selective exposure ^a		Selective elaboration ^b	
	<i>b</i>	<i>SE</i>	<i>b</i>	<i>SE</i>
Importance	.29**	.06	.22**	.06
Certainty	.09	.06	.13*	.06
Attitude extremity	.05	.05	-.03	.05
Attitude accessibility	.03	.15	-.04	.15
Positive attitude	.07	.06	.10†	.06
Negative attitude	.05	.06	.03	.06
Gender	-.10**	.03	-.06*	.02
Party identification	.01	.04	-.05	.04
Liberal/conservative ideology	.02	.04	.01	.04

^a $R^2 = .14$, $N = 550$. ^b $R^2 = .10$, $N = 533$.

† $p < .10$. * $p < .05$. ** $p < .01$.

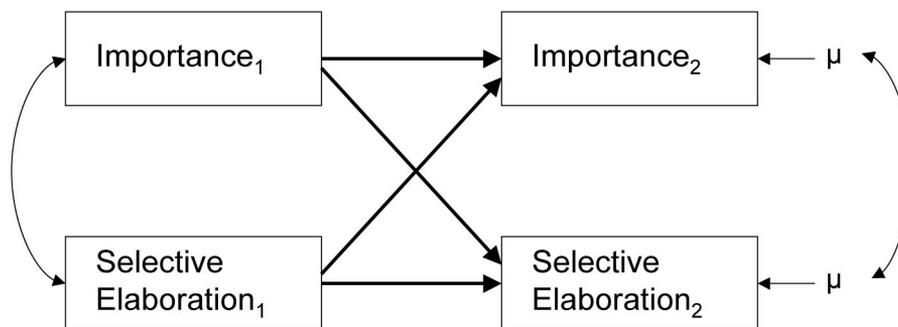


Figure 2. Core of the structural equation model estimated in Study 4.

ing) by the Ohio State University Survey Research Unit between September 17, 1997, and October 5, 1997. The most recent birthday method was used for respondent selection within households (Salmon & Nichols, 1983). Between December 20, 1997, and February 13, 1998, these participants were recontacted, and 497 of them (72%) agreed to be interviewed a second time.

Interviews

During each of the interviews, participants reported how important the issue of global warming was to them personally, how much they had thought about global warming, their attitudes toward global warming, and the certainty with which they held these beliefs and attitudes. Participants also reported their education, age, household income, race, and liberal/conservative ideology and answered five quiz questions assessing general political knowledge. Interviewers recorded each participant's gender.

Measures

Attitude importance. Participants indicated how important the issue of global warming was to them personally. Responses were coded to range from 0 to 1 (larger numbers indicated more importance).

Selective elaboration. Participants indicated how much thinking they had done about the issue of global warming before that day. Responses were coded to range from 0 to 1 (larger numbers indicated more thinking).

Attitude valence. Attitudes toward global warming were measured via a set of branching items like those used in Study 3. Participants with positive attitudes were coded 1 on the "positive attitude" dummy variable, and all other participants were coded 0. Participants with negative attitudes were coded 1 on the "negative attitude" dummy variable, and all other participants were coded 0.

Attitude extremity. Attitude extremity was coded 1 for people who said global warming would be very good or bad, .67 for people who said it would be somewhat good or bad, .33 for people who leaned toward one way or the other, and 0 for people who said it would be neither good nor bad.

Attitude certainty. Participants indicated how sure they were of their opinions about global warming. Responses were coded to range from 0 to 1 (larger numbers indicated greater certainty).

Liberal/conservative ideology. Responses to a set of branching questions placed participants on a 7-point scale ranging from strong liberal to strong conservative. Responses were coded to range from 0 to 1, with 0 representing strong conservatives and 1 representing strong liberals.

Gender. Gender was coded 0 for women and 1 for men.

Age. Participants were asked the year in which they were born. Age was calculated and then recoded to range from 0 (for 18 years) to 1 (for 95 years, the oldest age represented in the sample).

Race. White participants were coded 1, and all other participants were coded 0.

Education. Participants reported the highest level of education they had completed. People who had completed 8th grade or less were coded 0; those who had completed some high school were coded .14; those who were high school graduates were coded .29; those who had completed some college were coded .42; those who had an associate's degree or who had completed technical or trade school were coded .57; those who had a 4-year college degree were coded .71; those who had a master's degree were coded .86; and those who had a doctoral degree were coded 1.

Income. Participants were asked to select a category from a list of 10 to indicate their annual family income. Responses were coded to range from 0 to 1, with 0 representing the lowest income category (less than \$10,000) and 1 representing the highest income category (more than \$90,000).

General political knowledge. Using responses to five general political knowledge quiz questions, participants were given a score from 0 to 1 to indicate the percentage of these questions answered correctly.

Analysis

To gauge the parameters of the model shown in Figure 2, we regressed selective elaboration at Time 2 on selective elaboration at Time 1, importance at Time 1, and a series of control variables: attitude certainty at Time 1, attitude extremity at Time 1, attitude valence at Time 1, liberal/conservative ideology, gender, age, race, education, income, and general political knowledge. We also regressed importance at Time 2 on importance at Time 1, selective elaboration at Time 1, and the same control variables. To test whether the effects of importance on selective elaboration varied depending on general political knowledge, we estimated interactions of importance with general knowledge predicting selective elaboration.

Results

Effect of Importance on Selective Elaboration

A significant, positive relation appeared between importance at Time 1 and subsequent increases in selective elaboration (see row 2 of Table 2; $b = .11$, $SE = .05$, $p < .05$, $N = 411$), suggesting that greater personal importance led to more thinking about global warming. Elaboration at Time 2 was higher among participants for whom the attitude was of high importance (estimated marginal mean including elaboration at Time 1 as a covariate = .64) than among participants for whom the attitude was of low importance (estimated marginal mean including elaboration at Time 1 as a covariate = .58). The impact of importance at Time 1 on subsequent increases in selective elaboration was uniform across levels of political knowledge ($b = -.14$, $SE = .14$, ns , $N = 411$; see "Importance₁ × Political Knowledge" row in Table 2).

Table 2
Unstandardized Ordinary Least Squares Regression Coefficients for Longitudinal Analyses of the Relation Between Importance and Elaboration (Study 4)

Predictor	Dependent variable					
	Selective elaboration ₂				Importance ₂ ^c	
	Regression 1 ^a		Regression 2 ^b		<i>b</i>	<i>SE</i>
	<i>b</i>	<i>SE</i>	<i>b</i>	<i>SE</i>		
Selective elaboration ₁	.31**	.05	.31**	.05	.04	.04
Importance ₁	.11*	.05	.20†	.11	.44**	.05
Certainty ₁	.17**	.05	.17**	.05	.01	.04
Extremity ₁	.07	.06	.07	.06	.07	.05
Positive attitude ₁	-.06	.06	-.06	.06	-.01	.05
Negative attitude ₁	-.04	.05	-.04	.05	.02	.04
Liberal/conservative ideology	.01	.03	.01	.03	.03	.03
Gender	.04†	.02	.04	.02	-.02	.02
Age	.14*	.06	.14*	.06	.12*	.05
Race	.02	.03	.02	.03	-.04	.03
Education	-.10†	.06	-.10†	.06	-.08	.05
Income	.08†	.04	.08†	.04	.01	.04
Political knowledge	.00	.04	.07	.09	-.04	.04
Importance ₁ × Political Knowledge			-.14	.14		

Note. Subscripts "1" and "2" refer to measurements at Times 1 and 2, respectively.

^a $R^2 = .29$, $N = 411$. ^b $R^2 = .30$, $N = 411$. ^c $R^2 = .37$, $N = 411$.

† $p < .10$. * $p < .05$. ** $p < .01$.

Effect of Selective Elaboration on Importance

Selective elaboration at Time 1 did not predict subsequent changes in importance (see row 1 of Table 2: $b = .04$, $SE = .04$, ns , $N = 411$). Thus, importance appears to have caused selective elaboration, but no support was found for the reverse causal relation.

Other Strength-Related Attitude Features

As in Study 3, certainty at Time 1 was a positive predictor of subsequent increases in selective elaboration ($b = .17$, $SE = .05$, $p < .01$, $N = 411$; see row 3 of Table 2), and attitude extremity was not ($b = .07$, $SE = .06$, ns , $N = 411$). Neither certainty nor extremity at Time 1 predicted subsequent changes in importance (see rows 3 and 4 of Table 2).

Study 5

To test whether the association observed in Study 1 between attitude importance and memory accuracy was mediated by selective elaboration, we built a laboratory analog to Study 1 and varied participants' opportunities to engage in selective elaboration. If importance was related to memory accuracy when selective elaboration was permitted and if eliminating this opportunity significantly reduced the association, that would lend credibility to the notion that the association between importance and memory accuracy is partly mediated by selective elaboration.

Method

Participants

One hundred fifty-nine undergraduates at the University of Michigan participated in this study in partial fulfillment of an introductory psychology course requirement.

Procedure

Participants were mailed a questionnaire assessing their attitudes on various policy issues, including abortion and U.S. defense policy, as well as the personal importance of those attitudes. Participants came to the laboratory 1–2 months later and reported the same attitudes on a computer. After performing a 10-min distractor task, participants indicated whether they agreed or disagreed with a series of statements on various policy issues, including abortion and U.S. defense policy. After another 15-min distractor task, participants attempted to write down all of the statements they had judged.

Exposure Conditions

Participants were randomly assigned to either an unpaced or a paced exposure condition. Participants in the unpaced condition read the following instructions:

During this next task, a series of sentences will appear on the screen. These statements were made by prominent politicians, and each statement reflects a general opinion about abortion: some are extremely proabortion, some are extremely antiabortion, and some are more moderate positions. Your task is to indicate how much you agree or disagree with each statement. If you strongly agree with the statement, press the button on your right marked "strongly agree." If you strongly disagree with it, press the button on your left marked "strongly disagree." And if your feelings are somewhere in between these extremes, press the appropriate button in between: 2, 3, 4, 5, or 6.

Similar instructions appeared before the defense-spending statements, and participants in this condition then rated each statement about abortion and U.S. defense policy at their own pace. This permitted selective elaboration of statements whenever a participant chose to do so.

Participants in the paced condition received the following additional instructions: "Please make your response as quickly as possible. Do not spend much time deciding which button to press—we're interested in your first reaction." Thus, selective elaboration was minimized.

Measures

Attitude importance. Participants indicated how important each issue was to them; responses were coded to range from 0 to 1, with larger numbers indicating more importance. Participants also rank ordered a series of issues in terms of their personal importance. In addition to abortion and defense policy, this list included legalization of marijuana, racial integration, pollution, women's rights, capital punishment, gun control, and U.S. intervention in foreign countries. Rankings of abortion and defense policy were coded to range from 0 to 1, with larger numbers indicating more importance. These two importance scores were averaged for each issue into an index of importance.

Memory accuracy. Measures of cued recall accuracy were computed and standardized as in Study 1.

Attitudes. Participants reported their attitudes on rating scales with labeled endpoints (e.g., *abortion should never be permitted under any circumstances* and *abortion should be permitted whenever a woman wishes to have one*). Two such questions gauged participants' attitudes on each issue. Responses were coded to range from 0 to 1 (higher numbers indicated more liberal positions) and were averaged together.

Analysis

MLwiN was again used to conduct a multilevel regression. A two-level model was estimated, in which issue was Level 1 and participant was Level 2.

Results

Manipulation Check

Our manipulation of pacing relied on the assumption that participants in the paced condition would read the statements more quickly than would participants in the unpaced condition. Consistent with this assumption, participants in the paced condition spent an average of 4.04 s reading and making their judgment about each statement, whereas participants in the unpaced condition spent an average of 4.44 s, a significant difference, $F(1, 157) = 5.43, p < .05$.

Importance–Memory Accuracy Relation

Replicating Study 1's findings, the effect of importance on memory accuracy was positive and significant in the unpaced condition ($b = .93, SE = .42, p < .05, N = 120$). Among participants for whom the attitude was of high importance, memory accuracy was higher ($M = .26$) than among participants for whom the attitude was of low importance ($M = -.06$). In the paced condition, the impact of importance on memory accuracy was not significant ($b = -.12, SE = .30, ns, N = 174$). The effect of importance on memory accuracy was significantly stronger in the unpaced condition than in the paced condition ($z = 2.03, p < .05, N = 294$). This is consistent with the conclusion that the relation of importance to memory accuracy can be eliminated if selective elaboration is eliminated.

Differences Across Issues

The fit of these models was not improved by allowing the intercepts of the importance–memory accuracy relation to vary across the two issues—paced, $\Delta\chi^2(1, N = 174) = 2.28, ns$; unpaced, $\Delta\chi^2(1, N = 120) = 1.96, ns$ —so a single intercept was used for each condition. The effect of importance on memory

accuracy differed significantly across the two issues in the unpaced condition, $\Delta\chi^2(1, N = 120) = 4.64, p < .05$: This relation was positive and significant for abortion ($b = 1.09, SE = .42, p < .01$) and weaker and nonsignificant for U.S. defense policy ($b = .45, SE = .47, ns$).

Study 6

In Study 6, we examined the impact of a different pacing manipulation on the importance–memory accuracy relation to again test for mediation by selective elaboration.

Method

Participants

Eighty-six undergraduates at The Ohio State University participated in this study in partial fulfillment of an introductory psychology course requirement.

Procedure

Participants made two visits to our laboratory on successive days. Participants read statements of attitudes toward government policies during their first visits and completed memory assessment tasks and an attitude questionnaire during their second visits. During participants' first visits, they were seated alone in front of a computer monitor and keyboard in a small room and read the following instructions:

During this part of the experiment, you will read statements made by 10 candidates who ran for the United States Senate within the past 10 years. The statements have been selected from their debates with other candidates. You will then be asked to indicate HOW MUCH YOU WOULD SUPPORT THIS CANDIDATE by pressing the number that corresponds to your feelings.

Participants then read a total of 60 statements purportedly made by the 10 candidates. For each candidate, 1 statement on each of 6 issues (abortion, defense spending, women's rights, government efforts to stop industrial pollution, nuclear energy, and legalization of marijuana) was listed. Thus, participants encountered a total of 10 statements on each issue, 4 of which were favorable toward a specific policy (e.g., "Legalizing marijuana is a great idea"), another 4 of which were unfavorable toward the policy, and 2 of which were neutral.

All six statements made by a single candidate were presented simultaneously on the screen, and above each block of statements was the name of the candidate who purportedly had made them.⁶ Statements in a block were presented one above the other in an order that was uniquely randomized for each participant (e.g., for some participants, all 10 blocks of statements had a statement on abortion at the top; followed by a women's rights statement; followed by statements concerning pollution laws, legalization of marijuana, defense spending, and nuclear energy). After reading each block of statements, participants indicated how much they would support the candidate by pressing one of seven keys (1–7, with the endpoints labeled *would support* and *would not support*).

⁶ For each participant, the name of the candidate was randomly selected from a set of 10, and the 6 statements in each block were drawn randomly from the pool of 60 statements, with the constraint that each statement in a given block should concern a different issue. The statements in each block were presented in an order uniquely randomized each time a block was presented to a participant. As a result of this process, the mix of liberal and conservative statements made by a single candidate varied across candidates.

During participants' second visits, they completed cued recall and recognition memory tasks and a questionnaire measuring attitude importance and attitudes. The recognition memory task included all 60 old statements and 60 new statements. The 60 new statements included favorable, unfavorable, and neutral statements that were generated in the same manner as the old statements.

Exposure Conditions

Participants were randomly assigned to either an unpaced or a paced exposure condition. Participants in the unpaced condition read the following instructions: "You will read six statements made by each candidate. After you have read the statements, press any button to continue." Participants in this condition were permitted to view a block of statements for as long as they wished before moving on. After each block of statements, participants were asked how much they would support the candidate.

Participants in the paced condition read the following instructions instead: "You will have 20 seconds to read six statements made by each candidate. After 20 seconds, the statements will disappear, so read as quickly as you can." Participants saw each block of statements for 20 s and then evaluated the candidate. After evaluating the candidate, a new block appeared for 20 s, and the cycle continued until the participant had evaluated all 10 candidates. The time of 20 s was selected on the basis of pretest work indicating that this was approximately the amount of time needed simply to read the statements, thus precluding any elaboration.

Measures

Attitude importance. Participants indicated how important each issue was to them personally and how much they personally cared about each issue. Responses to the two questions for each issue were recoded to range from 0 to 1 (larger values indicated more importance) and averaged to produce an index of importance for each issue.

Memory accuracy. Measures of cued recall accuracy and recognition memory d' were computed and standardized as in Study 1.

Attitudes. Attitudes were measured as in Study 1.

Results

Manipulation Check

Consistent with the assumption that the pacing manipulation accelerated exposure to the statements, participants in the unpaced condition chose to read each block of statements for 29 s on average, in contrast to the 20 s given to participants in the paced condition, a highly significant difference, $t(106) = 11.21, p < .001$.

Importance–Memory Accuracy Relation

In a multilevel regression, the effect of importance on memory accuracy was significant and positive in the unpaced condition ($b = .66, SE = .16, p < .001, N = 536$). Memory accuracy was higher among participants above the median in attitude importance ($M = .35$) than among those below the median ($M = .09$). The impact of importance on memory accuracy was nonsignificant in the paced condition ($b = -.19, SE = .16, ns, N = 474$). The effect of importance on memory accuracy was significantly stronger in the unpaced condition than in the paced condition ($z = 3.79, p < .001, N = 1,010$), a finding that is again consistent with the notion that selective elaboration is necessary in order for the relation to appear.

Differences Across Issues and Memory Measures

Model fit was not significantly improved when the intercepts of the importance–memory accuracy relation were permitted to vary across issues and memory measures—unpaced, $\Delta\chi^2(11, N = 536) = 16.29, ns$; paced, $\Delta\chi^2(11, N = 474) = 17.06, ns$ —so a single intercept was used in each model. In the unpaced condition, the fit of the model did not improve when the effect of importance was allowed to vary across issues and memory accuracy measures, $\Delta\chi^2(11, N = 536) = 16.52, ns$. In the paced condition, the fit of the model was significantly better when the effect of importance was allowed to vary across issues, $\Delta\chi^2(11, N = 474) = 15.16, ns$, but when examined separately for each issue and memory measure, none of the importance–memory relations was positive and significant.

Attitudes

A measure of memory bias was constructed as in Study 1.⁷ Attitudes were marginally significantly related to memory bias in the paced condition ($b = -.39, SE = .21, p < .10, N = 240$), but the effect was in the opposite direction predicted by the congeniality hypothesis: Memory was better for statements that were inconsistent with participants' attitudes. The effect of attitudes on memory bias was not significant in the unpaced condition ($b = .03, SE = .19, ns, N = 274$). Importance did not interact with attitudes in predicting memory bias in either condition (paced, $b = -.31, SE = .77, ns, N = 240$; unpaced, $b = .85, SE = .69, ns, N = 274$).

Study 7

Study 7 was conducted to replicate Study 6 using a different manipulation of the opportunity for selective elaboration and using a new manipulation to test mediation of the importance–memory accuracy relation by selective exposure. This study included unpaced and paced conditions, plus two other conditions that were variants of the paced condition. The first variant was the elaboration time condition, in which participants were given extra time after reading each statement block to elaborate on it before making their judgments and moving on to the next block. If selective elaboration is partly responsible for the relation of importance with memory accuracy, this relation should reappear when paced participants are given time for elaboration, because they would have chosen to spend their elaboration time thinking about information relevant to the issues most important to them.

The second variant of the paced condition was the topic labels condition. In this condition, each statement was labeled with the name of the issue it addressed. If participants preferred to expose themselves to information on issues they considered more important, this presentation format would have allowed such selectivity. That is, participants could scan each screen for the names of the issues they cared about, read those statements, and ignore other statements. If the relation of importance to memory accuracy reappeared in this condition, it would be because we allowed

⁷ Only recognition scores were used to calculate memory bias in this study because participants recalled only a small number of statements about each issue. As a result, cued recall memory bias scores for some issues had no variance across participants.

selective exposure and would support the claim that selective exposure mediates the relation of importance with memory accuracy.

Method

Participants

Five hundred fifty-six undergraduates at The Ohio State University participated in this study in partial fulfillment of an introductory course requirement.

Procedure

The procedures for this study were nearly identical to those of Study 6. Participants made two visits to our laboratory on successive days. On the 1st day, they were exposed to statements concerning defense spending, women's rights, abortion, nuclear energy, and legalization of marijuana. Ten blocks of statements were presented to participants, and participants indicated how much they would support the candidate who made the statements after each block. Each block contained five statements, and each statement in a block addressed a different issue. The order of issues within blocks was randomized between participants but held constant across blocks within participants.

During their second visit, participants completed a cued recall task in which they wrote down as many statements as they could remember from their first visit. They then completed recognition memory tasks in which they attempted to discriminate between 50 new statements and the 50 old statements. Finally, participants completed a questionnaire in which they reported attitudes and personal importance.

Experimental Conditions

Participants were randomly assigned to one of the four experimental conditions. The instructions and procedures used in the unpaced condition were identical to those of Study 6. The paced condition was similar to Study 6, with one change. The instructions stated, "You will have 20 seconds to read five statements made by each candidate. After 20 seconds, the statements will disappear, so read as quickly as you can."

Participants in the elaboration time condition read the following instructions:

You will have 20 seconds to read five statements made by each candidate. After 20 seconds, the statements will disappear, so read as quickly as you can. Once the statements disappear, you will have 45 seconds to think about what you read.

After 20-s exposures to blocks of statements, each were followed by 45 s during which the computer screen was blank, after which participants indicated how much they would support the candidate.

Participants in the topic labels condition read the same instructions as participants in the paced condition, and each block of statements appeared for 20 s. In order to help these participants locate statements relevant to particular attitudes, each statement in a block was preceded by a single word that identified the general topic of the statement. The statements relevant to defense spending were preceded by the word *defense*, and the other statements were each preceded by *women*, *abortion*, *energy*, and *marijuana*, respectively.

Measures

Attitude importance. Attitude importance was measured and coded as in Study 6.

Memory accuracy. Issue-specific measures of cued recall accuracy and d' were computed and standardized as in the previous studies.

Attitudes. Attitudes were measured and coded as in Study 6.

Results

Manipulation Check

As expected, participants in the unpaced condition read each block of statements for 26 s on average, in contrast to the 20 s allowed participants in the three paced conditions (paced, topic labels, and elaboration time), a highly significant difference, $t(79) = 6.63, p < .001$.

Importance–Memory Accuracy Relation

In a multilevel regression, importance had a significant positive effect on memory accuracy in the unpaced condition ($b = .26, SE = .12, p < .05, N = 1,435$). Memory accuracy was higher for attitudes that were above the median in importance ($M = .17$) than those below the median ($M = .11$). The same positive and significant effect of importance on memory accuracy appeared in the elaboration time condition ($b = .26, SE = .11, p < .05, N = 1,300$; high importance, $M = .11$; low importance, $M = -.08$). The effect of importance on memory accuracy was also positive and significant in the topic labels condition ($b = .34, SE = .09, p < .01, N = 1,383$; high importance, $M = -.06$; low importance, $M = -.19$). As expected, the importance–memory accuracy relation was not significant in the paced condition ($b = .13, SE = .10, ns, N = 1,371$).

Effect of Exposure Condition on the Importance–Memory Accuracy Relation

As predicted, the effect of importance on memory accuracy did not differ significantly across the unpaced, selective elaboration, and topic labels conditions (topic labels vs. unpaced, $z = .50, ns$; topic labels vs. selective elaboration, $z = .51, ns$; unpaced vs. selective elaboration, $z = .02, ns$). When constrained to be equal across these three conditions, the effect of importance on memory accuracy was highly significant ($b = .28, SE = .06, p < .001, N = 5,489$), and the fit of this model was not significantly different from that of a model in which the slopes of the importance–memory relation were allowed to vary across all four conditions, $\Delta\chi^2(2, N = 5,489) = .79, ns$. The importance–memory accuracy relation in these three conditions combined was marginally significantly larger than the importance–memory accuracy relation in the paced condition ($z = 1.63, p < .10, N = 5,489$), as expected. All this is consistent with the notion that importance enhanced memory accuracy by inspiring selective exposure and selective elaboration.

Differences Across Issues and Memory Measures

The fit of these models was marginally significantly improved when the intercepts for the importance–memory accuracy relation were permitted to vary across issues and memory accuracy measures in the unpaced condition, $\Delta\chi^2(9, N = 1,435) = 14.83, p < .10$, though not in the topic labels condition, $\Delta\chi^2(9, N = 1,383) = 8.79, ns$; the elaboration time condition, $\Delta\chi^2(9, N = 1,300) = 11.86, ns$; or the paced condition, $\Delta\chi^2(9, N = 1,371) = 2.89, ns$. Therefore, in models in which the conditions were compared, separate intercepts were estimated for each issue and measure in the unpaced condition, but a single intercept was estimated for all

issues and memory accuracy measures in the paced, elaboration time, and topic labels conditions.

The fit of these models was significantly improved when the effect of importance was allowed to vary across issues and memory accuracy measures in the elaboration time condition, $\Delta\chi^2(9, N = 1,300) = 27.07, p < .001$, though not in the unpaced condition, $\Delta\chi^2(9, N = 1,435) = 11.90, ns$; the paced condition, $\Delta\chi^2(9, N = 1,371) = 9.52, ns$; or the topic labels condition, $\Delta\chi^2(9, N = 1,383) = 14.53, ns$. In the elaboration time condition, the importance–memory accuracy relation was consistently stronger for cued recall than for recognition memory.

Attitudes

We also tested the congeniality hypothesis using memory bias scores calculated as in Study 1.⁸ Participants' attitudes did not predict their inclination to remember liberal statements better than conservative ones in any of the conditions (unpaced, $b = .06, SE = .11, ns, N = 1,090$; paced, $b = .03, SE = .10, ns, N = 1,035$; elaboration time, $b = -.11, SE = .11, ns, N = 1,040$; topic labels, $b = -.09, SE = .10, ns, N = 1,095$), nor did these relations differ across the four conditions. When a main effect of importance and an interaction between importance and attitudes were included as predictors of memory bias, the interaction was nonsignificant in the unpaced, paced, and topic labels conditions (unpaced, $b = -.40, SE = .34, ns, N = 1,090$; paced, $b = -.46, SE = .33, ns, N = 1,033$; topic labels, $b = .26, SE = .33, ns, N = 1,094$), suggesting that attitude-driven memory bias did not appear at any level of importance in these conditions. In the elaboration time condition, this interaction was significant ($b = -1.09, SE = .35, p < .01$). Among participants for whom the attitude was below the median in importance, the relation between attitudes and memory bias was positive and nonsignificant ($b = .25, SE = .15, ns, N = 537$), and among participants for whom the attitude was above the median in importance, the relation between attitudes and memory bias was negative and marginally significant ($b = -.27, SE = .15, p < .10, N = 503$). Thus, the significant interaction was primarily the result of effects in different directions; neither group showed a significant congeniality bias.

Study 8

In our eighth study, we explored the impact of pacing and elaboration time manipulations on memory accuracy using a new dependent measure. Rather than asking participants to remember exactly what a political candidate had said, participants were asked to indicate whether a candidate favored or opposed each of a series of policies.

Method

Participants

One hundred thirty undergraduates at The Ohio State University participated in this study in partial fulfillment of an introductory course requirement.

Procedure

The procedures for this study were similar to those of Study 7, but the 50 statements participants read during the first lab visit were purportedly

made by a single political candidate. Twenty-five of the statements each pertained to one of 25 different target issues. The remaining 25 statements were about other matters. The statements were presented in 10 blocks of 5 statements. After viewing each block of statements, participants indicated how much they would support the candidate.

Participants were randomly assigned to one of three exposure conditions, paced, unpaced, and elaboration time, which were executed as in Study 7. One day after exposure to the statements, participants returned to the laboratory to complete a questionnaire asking them to indicate whether the candidate had supported or opposed each of the 25 target policies. Participants also indicated whether they supported or opposed each policy and the personal importance of their attitudes on the issues.

Measures

Attitude importance. Participants indicated how important each issue was to them personally. Responses were coded to range from 0 to 1, with larger numbers indicating more importance.

Memory accuracy. Measures of memory accuracy for each issue were coded 1 for participants who correctly identified the candidate's position and 0 for participants who did not.

Attitudes. Participants indicated whether they supported or opposed a series of policy positions. Responses were coded 0 for participants who advocated the conservative position and 1 for those who advocated the liberal position.

Analysis

Because the memory accuracy measure was dichotomous, a hierarchical binomial regression model was estimated using MLwiN to test the impact of importance on memory accuracy. A two-level model was estimated, with issue being Level 1 and participant being Level 2.

Results

Importance–Memory Accuracy Relation

Importance had the expected significant positive effect on memory accuracy in the unpaced condition ($b = .94, SE = .25, p < .01, N = 1,285$): 88% of participants who were above the median in attitude importance correctly identified the candidates' positions, compared with 79% of the participants below the median. A similar relation between importance and memory accuracy was observed in the elaboration time condition ($b = 1.27, SE = .32, p < .01, N = 931$; high importance, 84% correct identification of candidates' positions; low importance, 72% correct identification). As expected, the relation between importance and memory accuracy was not significant in the paced condition ($b = .47, SE = .30, ns, N = 937$).

Effect of Exposure Condition on the Importance–Memory Accuracy Relation

The effects of importance in the unpaced and elaboration time conditions were not significantly different from one another ($z =$

⁸ Memory bias scores were computed for recognition memory for all participants. For cued recall, memory bias scores could only be estimated for about half of the participants. The data for this study were collected in two waves, and separate coding of cued recall for liberal and conservative statements was not conducted for half of participants. Thus, substantial additional coding would be necessary to estimate cued recall memory bias scores for these participants.

.33, *ns*), and the importance–memory accuracy relation was highly significant in the two conditions combined ($b = 1.17, SE = 0.21, p < .01, N = 2,216$). The importance–memory accuracy relation in these two conditions was significantly stronger than that in the paced condition ($z = 1.92, p < .05, N = 3,153$).

Differences Across Issues

Because the dependent variable was dichotomous, no measure of model fit was provided by MLwiN. In the models we reported, the intercept was constrained to be equal across all issues within each condition but was allowed to vary across conditions. To test whether the slope of the importance effect differed across issues within condition, we conducted a series of z tests comparing the coefficients for each pair of issues. In all three conditions, the proportion of significant tests was not significantly different from that expected by chance alone: unpaced, $\chi^2(1, N = 1,285) = .31, ns$; paced, $\chi^2(1, N = 937) = 1.04, ns$; elaboration time, $\chi^2(1, N = 931) = .04, ns$.

Meta-Analysis of Studies 1, 5, 6, 7, and 8

To efficiently gauge the reliability of the differences in the importance–memory accuracy relation observed across exposure conditions in Studies 1, 5, 6, 7, and 8, we next conducted a meta-analysis.⁹ As expected, the importance–memory accuracy relation was positive and statistically significant in the unpaced conditions (average effect size $d = .26, z = 6.47, p < .001$; see row 6 of Table 3), but small and not significant in the paced conditions (average effect size $d = .00; z = 1.03, ns$; see row 11 of Table 3). This relation was significantly stronger in the unpaced conditions than in the paced conditions (focused comparison of significance levels: $z = 3.54, p < .01$).

Also as expected, the importance–memory accuracy relation was positive and significant in the elaboration time condition (average effect size $d = .20, z = 4.53, p < .001$; see row 14 of Table 3) and the topic labels condition (average effect size $d = .17, z = 3.76, p < .001$; see row 16 of Table 3). The importance–memory accuracy relation was significantly stronger in the elaboration time conditions than in the paced conditions (focused comparison of significance levels: $z = 3.11, p < .01$) and significantly stronger in the topic labels condition than in the paced conditions (focused comparison of significance levels: $z = 2.90, p < .01$). The unpaced and topic labels conditions did not differ significantly from one another (focused comparison of significance levels: $z = .79, ns$), nor did the unpaced and elaboration time conditions (focused comparison of significance levels: $z = .38, ns$) or the elaboration time and topic labels conditions (focused comparison of significance levels: $z = .45, ns$). All of this is consistent with the claim that the importance–memory accuracy relation was reliable when either selective elaboration or selective exposure was possible but not when both were eliminated.

Study 9

Although results of Studies 1–8 are consistent with the claim that importance leads to knowledge acquisition, some of the associations between importance and knowledge volume may be attributable to the reverse causal process: People may infer the personal importance of an attitude to them using the amount of

Table 3
Unstandardized Regression Coefficients Estimating the Associations Between Attitude Importance and Memory Accuracy in Studies 1, 5, 6, 7, and 8

Study	<i>b</i>	<i>SE</i>	Effect size (<i>d</i>)	<i>N</i>
Unpaced condition				
1	.46*	.23	.21	366
5	.93*	.42	.41	120
6	.66***	.16	.36	536
7	.26*	.12	.12	1,435
8	.94***	.25	.22	1,285
Average			.26***	
Paced condition				
5	−.12	.30	−.06	174
6	−.19	.16	−.11	474
7	.13	.10	.07	1,371
8	.47	.30	.10	937
Average			.00	
Elaboration time condition				
7	.26*	.11	.14	1,300
8	1.27***	.32	.26	931
Average			.20***	
Topic labels condition				
7	.34***	.09	.17	1,383
Average			.17***	

Note. *N* = Number of sets of observations used in the multilevel analyses.
* $p < .05$. *** $p < .001$.

attitude-relevant knowledge they have about the issue via a self-perception process (Bem, 1967, 1972). Feeling that one knows a great deal about an object may lead to the inference that the object is important. This logic presumes a two-step causal chain: Actual knowledge volume is a principal cause of perceived knowledge volume, and perceived knowledge volume may be a cause of attitude importance, so some of the associations of importance with actual knowledge volume may result from the latter causing the former, mediated by perceived knowledge volume.

The final study we report assesses the viability of this perspective by testing the crucial link: that people infer importance on the basis of perceived knowledge volume. To do so, we used survey data to estimate the parameters of a nonrecursive structural equation model based on the principles of instrumental variable analysis to gauge the reciprocal effects of importance and perceived knowledge volume on one another (for an explanation of the technique, see Heise, 1975; Kenny, 1979; for an example of its application, see Bizer & Krosnick, 2001).

Instrumental variable analysis in this instance requires that we have in hand an instrument for importance (i.e., a variable that causes importance but not perceived knowledge volume) and an

⁹ The effect sizes were homogeneous in the unpaced conditions, $\Delta\chi^2(4) = 8.57, p > .05$, and in the paced conditions, $\Delta\chi^2(3) = 6.96, p > .05$ (see Rosenthal, 1984), so we combined the effect sizes within each condition to compare meta-analytically to the topic labels and selective exposure conditions.

instrument for perceived knowledge volume (i.e., a variable that causes perceived knowledge volume but not importance). Two variables measured in the survey are thought to cause attitude importance, social identification and value relevance (see Boninger, Krosnick, Berent, & Fabrigar, 1995), and might therefore be able to serve as the former. Two variables thought to cause general political knowledge accumulation, exposure and attention to news media stories about politics generally (see Chang & Krosnick, 2003), were also measured and might be able to serve as the latter, thereby potentially constituting the empirical handles needed. We therefore collected data measuring importance, perceived knowledge volume, social identification, value relevance, and exposure and attention to news media stories about politics; tested the adequacy of the posited instrumental variables; and gauged the effects of importance on knowledge volume and the reverse using the structural equation model shown in Figure 3.

Method

Participants

One hundred fifty-nine undergraduates at The Ohio State University participated in this study in partial fulfillment of an introductory course requirement.

Procedures

Participants completed a written questionnaire and were debriefed and dismissed.

Measures

Attitude importance. Participants indicated how important the issue of abortion was to them personally, how much they personally cared about this issue, and how much they cared about this issue compared with other issues. Responses to each question were coded to range from 0, meaning minimal importance, to 1, meaning maximum importance.

Perceived knowledge volume. Participants indicated how knowledgeable they considered themselves to be about the issue of legalized abortion, how much information they had about this issue, and the extent to which they considered themselves to be experts on this issue. Responses were coded to range from 0 to 1 (larger numbers meant more knowledge).

Social identification. Participants identified one social group with whom they felt closest and most strongly identified. Participants indicated how important the issue of abortion was to this group and how much most members of this group cared about the issue of abortion. Responses were coded to range from 0 to 1 (larger numbers indicated more importance).

Value relevance. Participants indicated the degree to which their views on the issue of abortion were closely related to their *core values* (which were defined as their personal beliefs about right and wrong, their beliefs about good and bad ways of living, and their religious beliefs). Participants also indicated how frequently the issue of legalized abortion brought to mind important values, the extent to which their attitudes toward abortion were based on their basic values, and the degree to which their opinions on this issue were an expression of their core values. Responses were coded to range from 0 to 1 (larger numbers meant more value relevance).

Media exposure/attention. Participants indicated the number of days in the past week that they had watched the news on TV and the number of days in the past week that they had read a newspaper (ranging from 0 to 7). Participants also indicated how much attention they paid to stories about

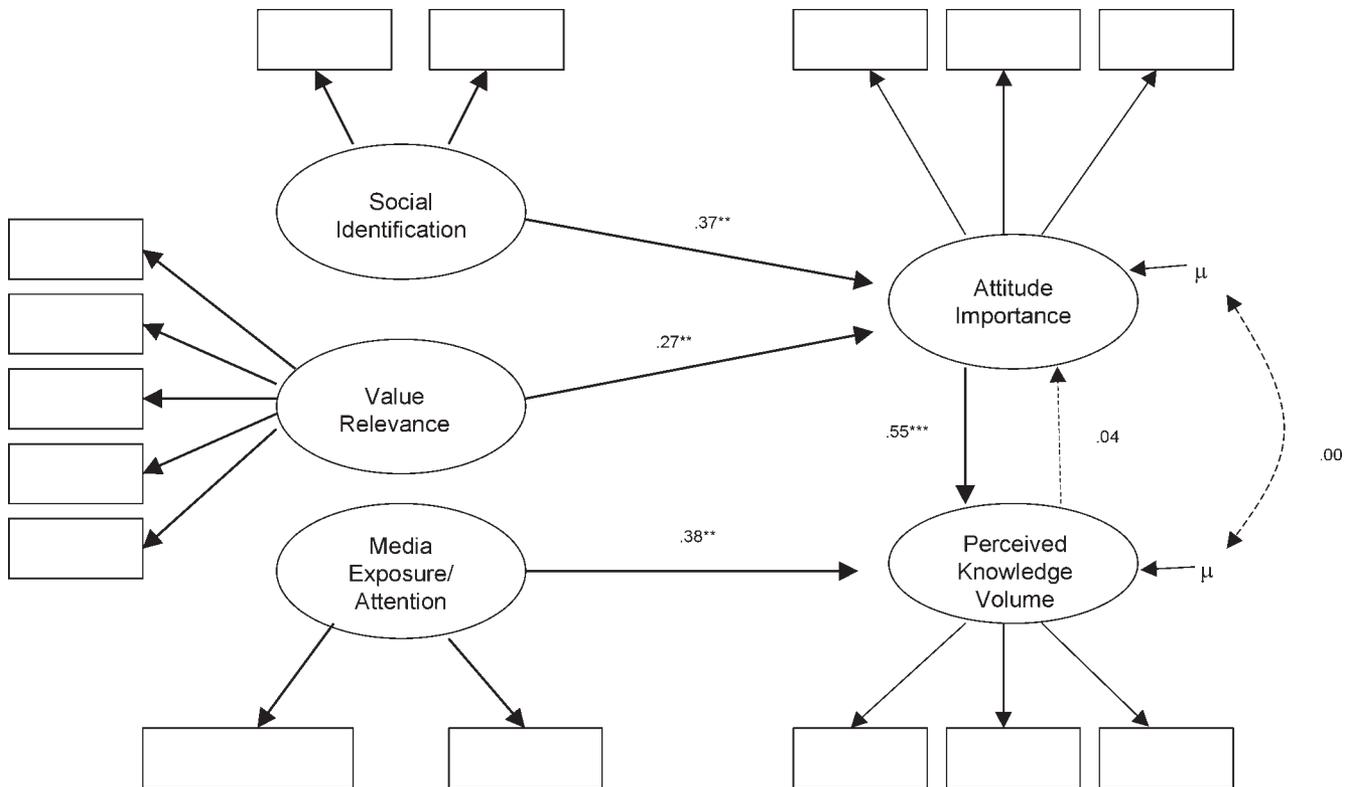


Figure 3. Nonrecursive structural equation model estimated in Study 9. Unstandardized parameter estimates are shown. Solid lines indicate statistically significant parameters, and dotted lines indicate nonsignificant parameters. All factor loadings were statistically significant (not shown). ***p* < .01. ****p* < .001.

government and political issues when they watched the news and how much attention they paid to such stories when they read the newspaper. Responses were coded to range from 0 to 1, with higher numbers indicating more TV watching, more newspaper reading, and greater attention. Responses to the pairs of exposure and attention questions were multiplied to yield indices of exposure/attention to TV news and to newspaper news, because past work has shown that knowledge volume accumulation via the news media is a joint product of exposure and attention (see Brodie, Hamel, Altman, Blendon, & Benson, 2003; Chaffee & Schleuder, 1986; Chang & Krosnick, 2003).

Results

Correlation Between Importance and Perceived Knowledge Volume

Using LISREL 8.3 (Jöreskog & Sörbom, 1998), we estimated the parameters of a structural equation model in which the three measures of attitude importance were treated as indicators of one latent construct (*importance*), the three measures of perceived knowledge volume were treated as indicators of a second latent construct (*perceived knowledge volume*), and the two latent constructs were permitted to correlate with one another. The model fit the data very well: $\chi^2(8, N = 158) = 11.97, ns$ ($\chi^2/df = 1.50$; goodness-of-fit index [GFI] = .98; normed fit index = .99; root-mean-square error of approximation [RMSEA] = .05), and the correlation between the two latent factors was .48 ($N = 158, SE = .07, p < .001$).

The Effects of Importance and Perceived Knowledge Volume on One Another

We then used LISREL to estimate the parameters of the structural equation model shown in Figure 3, wherein each latent variable had multiple indicators. The model fit the data well: $\chi^2(84, N = 152) = 92.52, p < .01$ ($\chi^2/df = 1.10$; GFI = .93; normed fit index = .94; RMSEA = .02). As expected, social identification and value relevance were positively and significantly related to attitude importance ($b = .37, SE = .10, p < .01$, and $b = .27, SE = .08, p < .01$, respectively), and media exposure/attention was significantly and positively related to perceived knowledge volume ($b = .38, SE = .14, p < .01$). The effect of importance on perceived knowledge volume was positive and significant ($b = .55, SE = .12, p < .01$), consistent with the notion that attaching importance to an issue led people to gather knowledge about that issue. In contrast, the effect of perceived knowledge volume on importance was not significant ($b = .04, SE = .34, ns$). This disconfirms the claim that knowing a great deal about an issue led people to infer that they attached more importance to it.

This analytic approach is valid only if social identification, value relevance, and media exposure/attention meet the criteria necessary to be considered instrumental variables. To gauge the viability of these assumptions, we conducted tests following the logic offered by L. R. James and Singh (1978) and A. Westholm (personal communication, March 29, 2002). For social identification and value relevance to be acceptable instrumental variables, they must have no residual association with perceived knowledge volume once importance has been controlled. For media exposure/attention to be an acceptable instrumental variable, it must have no residual association with attitude importance once perceived knowledge volume has been controlled.

We therefore estimated the parameters of two additional structural equation models (the measured variables used as indicators of each latent variable were the same as in Figure 3). In the first model, social identification, value relevance, media exposure/attention, and perceived knowledge volume were allowed to cause attitude importance, and the former four variables were allowed to covary: $\chi^2(80, N = 152) = 81.88, p < .01$ ($\chi^2/df = 1.02$; GFI = .93; normed fit index = .94; RMSEA < .01). Social identification, value relevance, and perceived knowledge volume had the expected significant, positive effects ($b = .31, SE = .07, p < .01$; $b = .21, SE = .07, p < .01$; and $b = .34, SE = .10, p < .01$, respectively), and media exposure/attention was not significantly related to importance ($b = -.12, SE = .14, ns$).

In a second model, social identification, value relevance, media exposure/attention, and importance were allowed to cause perceived knowledge volume, and the former four variables were allowed to covary: $\chi^2(80, N = 152) = 81.88, p < .01$ ($\chi^2/df = 1.02$; GFI = .93; normed fit index = .94; RMSEA < .01). Media exposure/attention and importance had the expected significant, positive effects on perceived knowledge volume ($b = .38, SE = .13, p < .01$, and $b = .32, SE = .09, p < .01$, respectively), and social identification and value relevance had no such effects ($b = .07, SE = .06, ns$, and $b = .08, SE = .07, ns$, respectively). Therefore, social identification, value relevance, and media exposure/attention satisfied the necessary criteria for serving as instrumental variables in Figure 3.

General Discussion

Memory Accuracy

These studies provide consistent support for the hypothesis that attaching personal importance to an attitude leads to the acquisition of attitude-relevant information in long-term memory. This relation appeared regardless of whether information was presented visually or orally, whether exposure took place naturally in participants' homes or in structured laboratory settings, whether the participants were heterogeneous general population samples of adults or college students, whether attitude importance was measured months before memory accuracy was assessed or was measured afterward, or whether participants were asked to recall or recognize the words they had read previously or simply to remember their essential meaning. Furthermore, this relation seems to have occurred because people selectively devoted cognitive resources to exposing themselves to and elaborating on the implications of information relevant to important attitudes.¹⁰ Thus, this evidence documents an explanation for findings of previous research studies showing that greater attitude importance is correlated with higher levels of knowledge accuracy in naturalistic contexts (Krosnick, 1990).

¹⁰ We did not formally document statistical mediation via the procedures outlined by Baron and Kenny (1986). Rather, we documented mediated causality via manipulations: By implementing procedures in the lab that held the posited mediators constant at zero (e.g., prohibiting selective elaboration or selective exposure), we achieved the same goal that Baron and Kenny's procedure achieves statistically, and we showed that under these circumstances, the relation of importance with memory accuracy disappeared. This is therefore evidence of causal mediation of comparable clarity.

These findings are valuable because they help to flesh out our understanding of the functioning of attitude importance. Much research to date has shown that more important attitudes have all the hallmarks of strength: They are more resistant to change, more stable over time, and have more impact on people's thinking and action (for a review, see Boninger, Krosnick, Berent, & Fabrigar, 1995). However, to date, relatively little is known about the cognitive mechanisms by which resistance and consequentiality follow from attitude importance. Our evidence suggests that importance is a motivator: It inspires gathering and thinking about attitude-relevant information and thereby yields an accumulation of such information in long-term memory, which then equips a person to resist persuasion and to use an attitude in making judgments and planning courses of action. It will be interesting for future research to conduct explicit tests of these mediational hypotheses about the mechanisms of attitude importance's influence.

Our theoretical account of the relation of selective elaboration with importance nicely dovetails with existing evidence on the organization of attitude-relevant information in memory. Berent and Krosnick (1995) showed that information relevant to more important attitudes is more elaborately organized in memory. Related pieces of information a person knows about a topic are more likely to be linked to one another in memory, and the organizational principles structuring such linkages are more complex in the case of more important attitudes. In light of the new evidence reported here, Berent and Krosnick's (1995) findings reinforce the apparent validity of the selective elaboration notion.

It is useful to note that we found evidence consistent with Eagly et al.'s (1999, 2000) on the congeniality hypothesis. Contrary to many prior claims in the literature (Levine & Murphy, 1943; J. V. Roberts, 1985; Watson & Hartmann, 1939), we (and Eagly et al., 1999, 2000) found that people were no more inclined to remember information with which they agreed than to remember information with which they disagreed. Furthermore, if anything, people who attached more importance to an attitude leaned toward remembering attitude-inconsistent information slightly better than remembering attitude-consistent information. Thus, it seems that attitude importance does not inspire an attitude-protective bias in information recall.

Implications Regarding Personal Relevance

In some regards, our results are very much in harmony with research findings on involvement and persuasion in the tradition of Petty and Cacioppo's (1986) elaboration likelihood model (ELM). Many investigations have shown that increasing the personal relevance of an attitude leads people to be more sensitive to variations in the quality of arguments made advocating a particular position, presumably because personal relevance increases the importance people attach to an attitude (see, e.g., Petty, Cacioppo, & Haugtvedt, 1992), which in turn enhances the degree to which people elaborate on attitude-relevant information, thus leading them to sharply differentiate strong from weak arguments. However, research in the ELM tradition has not yet explicitly tested whether importance is a mediator of the relation between personal relevance and elaboration.

Our results help to make the case for this relation. Although we did not examine personal relevance directly, we did find that attitude importance induces selective elaboration. Such evidence is one component of the array one must assemble to make the case

for mediation (see Baron & Kenny, 1986). Another component would be evidence that personal relevance causes attitude importance, evidence that Boninger, Krosnick, and Berent (1995) and Bizer and Krosnick (2001) have reported. Therefore, the stage seems appropriately set for the sort of partial correlation analysis suggested by Baron and Kenny (1986) to fully make the case for this multistep causal model.

Our results are at odds with ELM study findings in one particular respect, though. According to various models of memory (i.e., Hintzman, 1986; Raaijmakers & Shiffrin, 1981), expending more cognitive effort in elaborating on the meaning and implications of a piece of information should yield better memory for that information. This is just what our results suggest attitude importance instigates. Yet research in the ELM tradition has generally failed to find that personal relevance enhanced participants' memory for persuasive arguments to which they were exposed (Cacioppo, Petty, & Morris, 1983; Petty & Cacioppo, 1979; Petty, Cacioppo, & Goldman, 1981; Petty, Cacioppo, & Heesacker, 1981; Petty, Cacioppo, & Schumann, 1983).

There are at least four possible explanations for this discrepancy. One may be the time interval between the personal relevance induction and memory assessment in ELM studies. Participants began our studies with target attitudes presumably having been important to them for long periods of time, during which selective exposure and elaboration habits may have been established, yielding schematic storage structures that facilitated efficient and effective encoding and retrieval of relevant knowledge. In ELM studies, novel issues have usually been made personally relevant by manipulations implemented at the beginning of a laboratory visit, and memory was assessed only shortly thereafter. Perhaps personal relevance (or attitude importance) only enhances memory after some additional processes (e.g., knowledge acquisition and schema formation) have had time to unfold.

A second possible explanation for the discrepancy involves the ways in which information was presented to participants in our studies and in ELM studies. In ELM studies, participants have usually been given information about only a single topic, whereas in ours, participants were simultaneously exposed to information on many topics. Selective exposure and selective elaboration would only be expected to occur in multifaceted information environments, such as those we created. Because ELM study participants have typically been presented with a message on a single topic, selective exposure has not been possible, and selective elaboration may also not have been possible because there were no other competing stimuli to think about. This raises the possibility that the elaboration in which our participants engaged (which yielded improved memory) may have been different from the elaboration in which ELM study participants have engaged (which has yielded greater sensitivity to argument quality).

A third possible explanation for the discrepancy between our findings involves the statistical power of the tests we conducted. Memory accuracy has not been a primary focus of ELM research studies, so those studies usually have not entailed any special steps to maximize the power and sensitivity of their memory assessments. We did take such steps, such as collecting multiple memory measures (cued recall and recognition) for multiple attitudes in the same study. Thus, we were able to eliminate idiosyncratic error variance and maximize true score variance in our tests. Perhaps more elaborate memory assessments in ELM studies would have yielded the same memory accuracy findings as ours.

A final possible explanation involves the time interval between exposure and memory assessment. Whereas ELM studies typically have assessed memory moments after exposure to a persuasive message, our studies involved much longer delays between stimulus exposure and memory assessment. This raises the possibility that the impact of attitude importance on memory is not due only to differential processes at the time of encoding incoming information by people high and low in importance, as we have assumed. In addition, the effect of importance-inspired rich encoding of a stimulus may be to reduce the natural rate at which a memory trace of the stimulus decays over time. Information relevant to unimportant attitudes may decay more quickly than information relevant to important ones, so the memorial advantage of the latter information may only appear after a significant time interval has passed postexposure, even though the reason for this advantage is richer encoding at the time of exposure. Regardless of which explanation is correct for the discrepancy between typical ELM study findings and ours, we view this discrepancy as a useful starting point for future studies of the relation between attitudes and memory and for building conceptual bridges between the heretofore generally separate research programs on attitude importance and personal relevance.

Other Strength-Related Attitude Features

Additional findings of ours contribute to an ongoing debate about the nature of strength-related attitude features. First, attitude importance was found to cause knowledge, whereas knowledge, certainty, and extremity did not cause importance. This evidence is consistent in spirit with Bizer and Krosnick's (2001) evidence showing that importance causes accessibility but that accessibility does not cause importance. Thus, importance judgments appear to be consequential but not epiphenomenal inferences on the basis of self-perceptions derived from operative strength-related concepts such as knowledge or accessibility or from certainty or extremity. Furthermore, we saw evidence that these various attitude features behave differently from one another: Importance causes selective exposure and selective elaboration, whereas extremity and accessibility cause neither, and certainty causes selective elaboration but not selective exposure. This evidence is consonant with Visser, Bizer, and Krosnick's (in press) argument that strength-related attitude features should not be averaged together to form indexes, because this will often mask real and interesting relations among constructs.

Flashbulb Memories

It is interesting to note that our results on memory accuracy parallel naturalistic findings in the literature on flashbulb memories (see, e.g., Brown & Kulik, 1977; Curci, Luminet, Finkenauer, & Gisle, 2001; Winograd & Neisser, 1992). Brown and Kulik (1977) demonstrated that flashbulb memories were most often reported and were most elaborate for events that more individuals said were especially consequential for themselves, in that their lives were directly affected by those events. This is what we have labeled "self-interest" and is a primary cause of attitude importance (Boninger, Krosnick, & Berent, 1995; Krosnick, 1990). Therefore, presuming that consequentiality and importance are strongly related, Brown and Kulik's (1977) findings in aggregate, correlational analyses seem reinforced by our experimental results

conducted at the individual level. Furthermore, R. Brown and Kulik demonstrated that the consequentiality of events was related to the amount of rehearsal the event received (via conversations about it with others), a finding consistent with evidence that attitude importance is positively related to the frequency with which people talk about an attitude with others (Krosnick et al., 1993).

The American Political Process

Our finding that attitude importance enhances memory accuracy is useful partly because it addresses two interesting issues in the literature on political behavior. First, political theorists have argued that responsible democratic citizens form preferences about what they want government to do and use those preferences to guide their voting behavior in elections (e.g., Dahl, 1956; Pennock, 1979). In fact, many democratic citizens do base their votes on issues they care about personally (Anand & Krosnick, 2003; Krosnick, 1988). That is, greater importance is associated with greater impact of a person's attitude toward a policy on candidate preferences.

This is true partly because people are more likely to perceive a sizable difference between the stands competing candidates take on an issue (thereby permitting a choice between them on that basis) when the voters' own attitudes on the issue are personally important (Krosnick 1988, 1989). Our findings suggest a process through which these more differentiated perceptions may evolve. Candidates have many incentives to remain ambiguous in terms of their stands on policy issues (Page, 1976; Shepsle, 1972), so they rarely make clear statements of those stands. However, selective exposure to and elaboration of information relevant to important attitudes presumably allow people to acquire and retain subtle details of fact about candidates' statements and actions from which their issue stands can be inferred. On those few occasions when candidates do make clear statements of their policy stands, people who care deeply about the issues in question are especially likely to be listening and to remember what was said later. Thus, the motivation to acquire and process information inspired by attitude importance may yield more accurate perceptions of candidates' policy preferences.

Our evidence also addresses the popular perception among political scientists that democratic citizens are generally ill informed (e.g., Sussman, 1988) and are therefore "irresponsible" (Key, 1966). Our studies suggest that citizens attend to and retain political information about issues that are personally important to them. Research on issue publics (i.e., groups of individuals who care deeply about a given policy issue) has suggested that people are likely to care deeply about only a small number of issues and that caring about an issue is typically unrelated to caring about another issue and not limited to political elites (see Krosnick, 1990). Thus, most citizens are likely to be knowledgeable about the few issues that they care deeply about and are therefore equipped to be "responsible voters" in this regard.

Conclusion

There are two distinct camps within the community of scholars interested in memory processes. The advocates of the "everyday memory approach" suggest that the most interesting lessons can be learned by studying these processes as they unfold naturally in the

course of daily life. The advocates of controlled laboratory studies argue that such an approach is doomed to yield at best ambiguous evidence regarding the causal processes at work. We see merit in the views of both camps, so we set out to study the relation of attitude importance to memory using both approaches in concert with one another. The result is a set of consistent evidence documenting both the causal processes at work and the ecological validity of those findings. We look forward to more such bridges between the two memory research camps being built in the future to push ahead our understanding of these and other such significant psychological phenomena.

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