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# Ease of Retrieval Effects in Persuasion: A Self-Validation Analysis

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*Three studies are reported examining a new explanation for ease of retrieval effects in persuasion. In each study, participants read a persuasive communication and were induced to generate either a low or high number of favorable or unfavorable thoughts in response. In conflict with the assumptions of most previous studies, the authors predicted and found that ease of retrieval effects occur primarily under high rather than low-elaboration conditions. Under high-elaboration conditions, people were more influenced by their thoughts when few rather than many were retrieved (ease of retrieval effect), and this was mediated by the confidence participants had in those thoughts. These findings are consistent with the self-validation hypothesis. Under low-elaboration conditions, participants based judgments more on the actual number of thoughts generated, reflecting a numerosity heuristic.*

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**T**he notion that people sometimes base judgments on the subjective experience of ease with which certain information comes to mind has received considerable attention recently. Tversky and Kahneman (1973) introduced the idea that people perceive events as more likely if previous examples of them are highly accessible in memory. Inspired by this availability heuristic, Schwarz et al. (1991) argued that people use the experienced ease of retrieval as a heuristic when forming judgments. In their research, Schwarz et al. asked participants to rate themselves on assertiveness after recalling either 6 or 12 examples of their own assertive behaviors. The result was that people rated themselves as more assertive after recalling 6 rather than 12 assertive behaviors. Schwarz and colleagues argued that people's judgments of their own assertiveness reflected the subjective experience they had in recalling examples of that type of behavior. That is, people experienced greater difficulty in generat-

ing 12 than 6 examples of assertive behaviors, and they presumably interpreted this difficulty as indicating that assertive behaviors were low in frequency or likelihood, thus inferring that they must not be very assertive.

Schwarz et al.'s discovery of this ease of retrieval effect has proven to be quite important, sparking new research in a number of different domains. For example, ease of retrieval has been found to impact probability estimates (Wänke, Schwarz, & Bless, 1995), stereotyping (Dijksterhuis, Macrae, & Haddock, 1999), ingroup versus outgroup judgments (Rothman & Hardin, 1997), health risk assessments (Rothman & Schwarz, 1998), attitudes (Haddock, 2000; Haddock, Rothman, & Schwarz, 1996; Wänke, Bless, & Biller, 1996; Wänke, Bohner, & Jurkowsitch, 1997), and attitude strength (Haddock, Rothman, Reber, & Schwarz, 1999). The present research addresses the role of ease of retrieval effects in persuasion and seeks to shed light on both when and why these effects occur. In one recent demonstration of ease effects in persuasion, Wänke et al. (1996) asked participants to generate either three or seven arguments in favor of using public transportation. They found that

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participants had more favorable attitudes toward public transportation after listing three rather than seven positive arguments (see also Wänke et al., 1997).

In most of the work on ease of retrieval, the effects have been assumed to operate according to the availability heuristic. That is, it has been argued that the subjective experience of ease or difficulty affects inferences about the amount of information available, which in turn serves as a judgmental heuristic. Difficulty in generating favorable arguments, for example, is assumed to indicate that those arguments are few in number, and thus, the position supported might be questionable. The experience of ease, on the other hand, would presumably suggest that many such arguments exist and, thus, that the position they support is a good one. Although the availability heuristic explanation dominates the ease of retrieval literature, direct mediational evidence has been lacking. In an application of the ease of retrieval paradigm to stereotyping, Dijksterhuis et al. (1999) produced mediational evidence for the role of perceived difficulty but provided no evidence that the feeling of difficulty was translated into an inference of availability.

The present research examines an alternative mechanism to account for ease of retrieval effects. We agree with prior literature that when an individual is asked to generate a given number of thoughts, he or she can experience greater difficulty to the extent that many thoughts are required. We depart, however, by arguing that the ease or difficulty experienced can impact the confidence the individual has in his or her thoughts and that this confidence in thoughts determines the extent to which people rely on them. The easier it is to generate a list of thoughts (because a low number is required), the more confidence an individual should have in these thoughts. The more difficult it is to generate a list of thoughts (because a high number is required), the less confidence an individual should have in them.

Of importance, although confidence in thoughts and the perceived number of thoughts available could be viewed as closely related, we argue that they are orthogonal constructs. For instance, a person thinking about a tax cut might easily think of two positive consequences, perceive those thoughts to be highly diagnostic about what he or she thinks, and thus be very confident in them without assuming there are many more. In theory, one could believe there are very few positive consequences associated with a tax cut but have so much confidence in those few positive consequences that the tax cut is favored anyway. Conversely, one could think there are many positive consequences but have so little confidence in any one of them that the tax cut is still not favored. We posit that the feeling of confidence stems not from the perceived number of thoughts available but more directly from the feeling of ease itself. In this

respect, our position is conceptually similar to that of perceptual fluency (Jacoby, 1983; see also Gill, Swann, & Silvera, 1998). Perceptual fluency suggests that the easier it is to process stimuli, the more favorably those stimuli tend to be evaluated (Bornstein, 1989). According to this logic, if the stimuli in question are one's own thoughts, ease of processing (or generation) should lead one to view one's thoughts as better, or more valid, which might increase confidence in them. For example, if one were asked to name the capital of Ohio, the easier it is to retrieve "Columbus," the more valid one would think that answer is, and the more confidence one would have in it. The current research aims to provide the first mediational evidence for the role of thought confidence in ease of retrieval effects.<sup>1</sup>

#### POSSIBLE MODERATION OF EASE OF RETRIEVAL EFFECTS

Of interest, the availability heuristic and thought confidence explanations make different predictions as to when ease of retrieval effects should occur. According to the former notion and most of the current literature on ease of retrieval effects, the experienced ease or difficulty is used as a heuristic when forming judgments (see reviews by Haddock, 2000; Schwarz, 1998). That is, asking oneself how easy it has been to generate arguments can provide an efficient decision cue that simplifies the judgment task and limits the demands on cognitive capacity. This idea is consistent with the notion that "cognitive feelings" (i.e., nonaffective cognitive experiences) can provide heuristic information much as affective experiences can (Clore, 1992; Schwarz, 1990). Consistent with the research on other persuasion heuristics (see Chaiken, 1987; Petty & Cacioppo, 1986; Petty & Wegener, 1998), it has been posited that ease of retrieval effects should be most powerful when conditions limit people's motivation or ability to think about issue-relevant information (see Chen & Chaiken, 1999; Haddock, 2000; Schwarz, 1998).

According to the thought confidence explanation, however, ease of retrieval effects should be more likely to occur when people's motivation and ability to process are relatively high. Recent research by Petty, Briñol, and Tormala (2002) on the self-validation hypothesis suggests that assessments of thought confidence are more impactful under high- rather than low-elaboration conditions. To begin with, under high-elaboration conditions, thinking is more extensive. Unless people are actively generating thoughts, assessments of these thoughts, such as how easy or difficult it was to generate them, should not matter. Furthermore, under high-elaboration conditions, people have increased motivation or ability to engage in this higher order kind of processing—that is, attending to their thoughts

and gauging their feelings about them. In several studies testing this notion, Petty et al. (2002) both measured and manipulated the confidence participants had in their own cognitive responses to a message. Increased confidence in thoughts was associated with increased persuasion when the thoughts were favorable, but increased confidence in thoughts was associated with decreased persuasion when thoughts were unfavorable. Furthermore, these effects were confined to situations in which participants were likely to be high in their extent of thinking. These data suggest that people are more attuned to subjective assessments of their own thoughts when they are processing relatively extensively. Therefore, if ease of retrieval affects confidence in thoughts, its impact on attitude change should be greatest under high-elaboration conditions.

#### EMPIRICAL EVIDENCE FOR MODERATION OF EASE OF RETRIEVAL EFFECTS

##### *Evidence Favoring Low-Elaboration Conditions*

In one relevant study, Rothman and Schwarz (1998) tested the prevailing assumption that ease of retrieval effects is most prominent under low-elaboration conditions (operationalized as low personal relevance; see Petty & Cacioppo, 1979). They instructed participants to list either three or eight risk factors for heart disease and found that low-personal-relevance participants perceived greater risk after generating three than eight risk factors, whereas high-personal-relevance participants perceived greater risk after generating eight than three risk factors. They argued that low-relevance participants were not motivated to attend to the content (i.e., number) of the risk factors they generated so they used their subjective experience as a heuristic. High-relevance participants, however, were presumably more motivated to think about the content (i.e., number) of the risks they listed and judged their risk as higher after generating many.

If one assumes that ease of retrieval operates as a heuristic, the results of the Rothman and Schwarz (1998) study appear to be consistent with predictions from dual process models of persuasion such as the Elaboration Likelihood Model (Petty & Cacioppo, 1986) and the Heuristic-Systematic Model (Chaiken, Liberman, & Eagly, 1989). According to these models, the content of one's thoughts best predicts attitudes when elaboration likelihood is high. Simple cues and heuristics, on the other hand, predict attitudes best when elaboration likelihood is low. However, given that previous research has revealed a tendency for low-elaboration individuals to rely on number heuristics in forming attitudes (e.g., Pelham, Sumarta, & Myaskovsky, 1994; Petty &

Cacioppo, 1984), it is not clear why subjective experience would operate as a heuristic for low-thinking individuals but perceived number of thoughts in a given direction would not (e.g., "I generated many risk factors so it must be risky"). In other words, Rothman and Schwarz offered no a priori reason to expect an ease heuristic as opposed to a number heuristic to operate under low-elaboration conditions.

In fact, closer inspection of Rothman and Schwarz's (1998) data permits a possible alternative conclusion to the one they drew. Their overall design included two different variables intended to reflect personal relevance: participants' family history of heart disease and whether participants were instructed to list risk factors for themselves or the "average man." Personal relevance was presumably higher for participants with a family history as well as for participants listing risk factors for themselves. Because these variables were unconfounded in this study, however, three levels of personal relevance can actually be identified: low (no family history, generate risks for average man), high (family history, risks for self), and moderate (the other two combinations of these variables). Examination of the data using this categorization shows that the ease effect was greater in the moderate- than in the high-relevance conditions, as Rothman and Schwarz expected, but the ease effect was also somewhat greater in the moderate- than in the low-relevance condition, contrary to their expectations.

Thus, Rothman and Schwarz's (1998) data are amenable to at least two different interpretations, depending on the comparison one decides to make. Comparing moderate- to high-relevance conditions, it appears that ease effects occurred under relatively low-elaboration conditions. Comparing low- to moderate-relevance conditions, on the other hand, it appears that ease effects were somewhat stronger under relatively high-elaboration conditions. Rothman and Schwarz concluded that ease of retrieval information was used as a heuristic for low-elaboration participants, but only when some "minimum degree of perceived relevance" (p. 1059) was present.

Although it is quite reasonable to suggest that use of heuristics often requires at least some minimal cognitive effort (Petty & Cacioppo, 1986), we suggest another explanation for their results. Rather than eliminate the low-relevance condition, we suspect that it may be more appropriate to eliminate the high-relevance condition and focus on the comparison of low with moderate relevance. This is because one of the personal-relevance variables Rothman and Schwarz (1998) examined—family history—was an individual difference variable. Individuals with a family history of heart disease are likely to be more acutely aware of their own personal risk and possibly have more knowledge about risk factors than those

without a family history. As a consequence, those with a family history could have been more adept at generating a list of risk factors. That is, individuals in the high-relevance condition (family history, own risk factors) may not have experienced as much difficulty in coming up with eight risk factors as those without a family history, and the risk factors they listed may have been more compelling or serious as compared to those listed by participants in the other conditions. Consistent with this idea, Rothman and Schwarz noted that it was not as difficult for their high-relevance group to list eight risk factors as it was for their moderate- and low-relevance groups. This reduced perception of difficulty should have reduced the ease effect in this condition. Furthermore, if high-relevance participants were able to list more compelling risk factors than low- or moderate-relevance participants, this could explain why they reported greater risk after generating a large number of risks, which would compromise comparison with the other participants. If the high-relevance participants are eliminated and the focus of comparison is on moderate-versus low-relevance participants, then the direction of effect is that increasing elaboration likelihood increases the ease of retrieval effect, consistent with the self-validation hypothesis.<sup>2</sup>

*Evidence Favoring  
High-Elaboration Conditions*

In a recent chapter on ease of retrieval in the attitudes domain, Wänke and Bless (2000) departed from prior research and suggested that ease effects should be more likely to occur when processing motivation is relatively high. In two studies reported in this chapter, they presented participants with a strong or a weak persuasive message containing information about a coffee maker and asked them to recall information from the message. They found that ease of retrieval enhanced persuasion when accuracy motivation was high but not when it was low and that this occurred in both the strong and weak message conditions. They argued that this was consistent with the notion that perceived difficulty matters because it reduces the “compellingness” of the retrieved information. In their words, “information that comes to mind less easily may seem less valid and less compelling” (p. 149). Essentially, Wänke and Bless suggested that externally presented arguments are seen as increasingly compelling to the extent that they are easy to retrieve. Because of this enhanced compellingness, they predicted that as retrieval became easier, both strong and weak arguments that were recalled would be enhanced in persuasiveness. According to this logic, subjective ease of retrieval should always enhance persuasion.

Although we agree with Wänke and Bless’s (2000) general conceptualization of when ease effects occur, we

do not find their research to be definitive for several reasons. First, we disagree with the notion that ease invariably enhances persuasion. If weak arguments are those that elicit primarily unfavorable thoughts (Petty & Cacioppo, 1986), then easy retrieval should reduce persuasion. Wänke and Bless may not have observed reduced persuasion in their weak argument conditions because the weak arguments still elicited mostly favorable reactions (i.e., they were not truly weak by the common definition; Petty & Cacioppo, 1986). In general, the confidence hypothesis holds that the feeling of ease can increase or decrease persuasion, depending on the valence of the information recalled or the direction of the thoughts generated. In the current research, we instructed individuals to generate either positive or negative thoughts (see Killeya & Johnson, 1998) to test this possibility.

A second concern about the Wänke and Bless (2000) research is that their manipulation of elaboration came after the persuasive message had been presented. Thus, this manipulation likely affected the effort participants put into recalling information from the message but could not have affected their extent of processing the message or the attitude object during message presentation. We sought to demonstrate that increased elaboration about an object or issue during message presentation could accentuate ease effects.

Finally, Wänke and Bless (2000) used an unusual manipulation of ease of retrieval—asking participants to recall information from a persuasive message using retrieval cues that were either helpful (easy) or unhelpful (difficult). Although their manipulation is a clever one with some advantages, it would have been especially compelling to show that high-elaboration participants relied on subjective experience instead of the actual amount of information, as is customary in the ease of retrieval literature. In short, although the Wänke and Bless research is suggestive, it is still not clear if high elaboration can accentuate ease effects in the standard ease of retrieval paradigm, and if so, why this effect occurs.

OVERVIEW OF THE  
PRESENT RESEARCH

Most of the previous literature on ease of retrieval clearly suggests that subjective experience should function as a heuristic in the judgmental process when cognitive processing is relatively low. However, relatively little empirical evidence has been gathered to examine this notion. As detailed above, attempts at clarifying the role of elaboration have produced ambiguous findings. The present research was designed to demonstrate more convincingly that ease of retrieval effects are more likely to occur under high- rather than low-elaboration conditions. Furthermore, we sought to demonstrate that ease

of retrieval effects can be mediated by the confidence individuals have in their thoughts, with greater ease of retrieval producing more thought confidence and ultimately more thought-congruent attitudes. Finally, in accord with prior research on the number heuristic (Pelham et al., 1994; Petty & Cacioppo, 1984), we hypothesized that the number effect (i.e., more thought-congruent attitudes when many thoughts are listed) would be more apparent under low- than high-elaboration conditions.

In three studies, we asked participants to generate either a small or a large number of favorable or unfavorable thoughts in response to a persuasive message and then to report their attitudes toward the issue raised in the message. We expected that high-elaboration participants would be more influenced by the subjective experience of generating these thoughts (e.g., favoring the issue more after listing 2 than 10 favorable thoughts), whereas low-elaboration participants would be relatively more influenced by the actual number they generated (e.g., favoring the issue more after listing 10 than 2 favorable thoughts). In Study 3, we sought to provide evidence for the mediation of ease of retrieval effects. Specifically, we predicted that ease effects would be mediated by the confidence individuals had in the thoughts they listed. That is, we expected that attitudes would be more consistent with thoughts when participants were confident in them—when they generated an easy (small) number rather than a difficult (large) number of thoughts.

#### STUDY 1

In Study 1, we used a stable individual difference assessment of elaboration—the need for cognition (NC) (Cacioppo & Petty, 1982). NC refers to the tendency to engage in and enjoy effortful thought. Individuals high in NC consistently have been found to engage in greater elaboration of persuasive messages than those low in NC (see Cacioppo, Petty, Feinstein, & Jarvis, 1996, for a review). In Study 1, participants were asked to generate counterarguments to a persuasive communication. This procedure was adapted from previous research by Killeya and Johnson (1998), which showed that directed negative thoughts lead to unfavorable attitudes. An ease of retrieval effect would be present to the extent that individuals opposed the persuasive message more after generating a low number of counterarguments than a high number of counterarguments. We expected the ease effect to be most prevalent for individuals high in NC. For low-NC individuals, we expected a heuristic or cue effect, whereby they would oppose the message more after generating many rather than few counterarguments.

#### Method

##### *PARTICIPANTS AND DESIGN*

Fifty-nine undergraduates from Ohio State University (OSU) participated in partial fulfillment of a course requirement in their introductory psychology course. Participants completed the NC scale and were randomly assigned to generate either two or eight counterarguments against a persuasive message.

##### *PROCEDURE*

All experimental sessions were conducted on computers using MediaLab version 3.0 (Jarvis, 1997). When participants arrived, they were seated in a room with 10 individually partitioned computer stations. They were asked to read the instructions on their screens and begin the experiment. Participants read that a specially appointed committee at their university had recently submitted a proposal to implement senior comprehensive exams as a graduation requirement beginning in the next 2 years. Failure to pass these exams, they were told, would result in remedial work to be completed before a degree could be conferred. Participants were led to believe that before implementing this policy, their university's Board of Trustees wanted to assess students' reactions and so they would be asked to read about the policy and answer several questions. After reading these instructions, participants were presented with four arguments in favor of implementing the senior comprehensive exam policy at OSU. The message included more detailed versions of the following arguments, adapted from Petty and Cacioppo (1986): grades would improve if the exams were adopted, the university's prestige and reputation would be enhanced, the quality of teaching would increase, and the average starting salary of OSU graduates would increase. After reading the message, participants listed a high or low number of arguments against it and completed attitude items and the NC scale.

##### *INDEPENDENT VARIABLES*

*Number of counterarguments.* Immediately following the information in the message, participants were told that the Board of Trustees would like to collect the arguments they could raise against the exams. They were then asked to list either two or eight arguments against the exam proposal (as determined by random assignment).<sup>3</sup> Participants used the computer keyboard to enter their counterarguments into different boxes, each appearing on a separate screen.

*Need for cognition.* At the end of the experiment, participants completed the 18-item version of the NC scale (Cacioppo, Petty, & Kao, 1984). This scale contains statements such as "I prefer complex to simple problems" and "Thinking is not my idea of fun" (reverse-scored). Participants rated how characteristic each statement was

of them on a 5-point scale anchored at *extremely uncharacteristic* and *extremely characteristic*. Because items on this scale were highly reliable ( $\alpha = .88$ ), they were summed to form one overall index. The range of scores was 26 to 87 (possible range is 18-90) and the median score was 61. Need for cognition scores were not affected by the experimental manipulation.

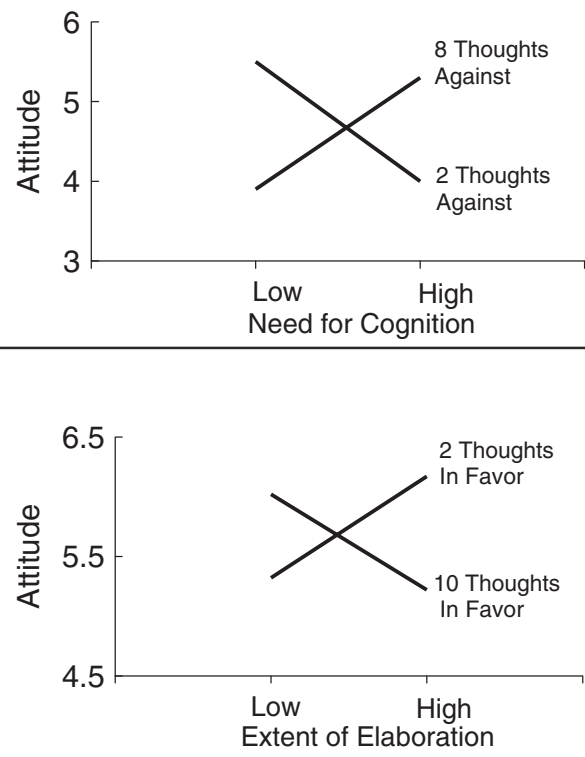
#### ATTITUDE MEASURE

Participants' attitudes toward senior comprehensive exams were assessed using four 9-point semantic differential scales with the following anchors: *negative-positive*, *bad-good*, *unfavorable-favorable*, and *against-in favor*. Responses to these items were highly consistent ( $\alpha = .96$ ) and were thus averaged to form an overall attitude index.

#### Results and Discussion

The attitude data were analyzed using a hierarchical regression where NC was treated as a continuous predictor variable and the number of counterarguments manipulation was dummy coded. We centered NC scores (i.e., set the mean to zero; see Aiken & West, 1991) and followed the standard hierarchical regression procedures outlined by Cohen and Cohen (1983): NC and number of counterarguments were entered first to test for main effects and their product was entered next to test for the interaction. No main effects were obtained,  $ps > .63$ , but there was a significant interaction between NC and number of counterarguments,  $\beta = .48$ ,  $t(3, 55) = 2.70$ ,  $p < .01$ . As illustrated in the top panel of Figure 1, which plots the predicted means for attitudes at one standard deviation above and below the NC mean, this interaction revealed the expected ease effect for high-NC individuals (analyzed at +1 SD),  $\beta = .32$ ,  $t(3, 55) = 1.89$ ,  $p < .07$ , such that they opposed the exams more (i.e., reported less favorable attitudes) after listing two rather than eight arguments against the exams. Low-NC individuals (analyzed at -1 SD) demonstrated attitudes in the reverse direction, opposing the exams more after listing eight rather than two counterarguments,  $\beta = -.39$ ,  $t(3, 55) = -1.97$ ,  $p < .06$ .

Of importance, one plausible alternative to our thought confidence explanation would be that there were differences in the quality of counterarguments listed across the two and eight argument conditions. That is, participants might have generated counterarguments that were lower in quality when they were required to generate many of them. Consistent with previous research on the elaboration likelihood model, high NCs would be expected to be particularly sensitive to these quality differences, whereas low NCs would be expected to rely more on the number of arguments (Petty & Cacioppo, 1984). Thus, we could have obtained



**Figure 1:** Top panel: Attitude ratings in Study 1 as a function of need for cognition and the number of counterarguments generated (plotted at +1 and 1 SD for NC). Bottom panel: Attitude ratings in Study 2 as a function of manipulated elaboration likelihood and the number of positive thoughts generated.

NOTE: In the top panel, lower scores indicate more thought congruent attitudes. In the bottom panel, higher scores indicate more thought-congruent attitudes.

the same pattern of results in this study, but for a different reason. To assess the tenability of this explanation, a judge, blind to experimental hypotheses and level of NC, coded the quality of counterarguments participants generated on a 9-point scale anchored at *very low quality* and *very high quality*.<sup>4</sup> The quality ratings were then averaged for each participant and the data were submitted to the same hierarchical regression analysis described for the attitude data. Quality of counterarguments was significantly and positively correlated with NC,  $\beta = .50$ ,  $t(2, 56) = 3.36$ ,  $p < .01$ , with higher NC being associated with higher quality counterarguments; however, neither the main effect for number of counterarguments nor the two-way interaction was significant,  $ps > .15$ . Thus, no support was found for this alternative explanation.

Consistent with our expectations, then, we found that high NCs appeared to base their attitudes more on the subjective experience of argument generation, whereas

individuals relatively lower in NC did not. Also relevant, we found that ease is not inevitably translated into more favorable attitudes but can produce less favorable attitudes when thoughts are negative (e.g., counterarguments). The reverse direction of means for low NCs is consistent with the notion that these individuals based their attitudes on the actual number of counterarguments generated (i.e., rather than the subjective experience associated with it), perhaps using the number of counterarguments as a heuristic or simple peripheral cue.

## STUDY 2

To conceptually replicate and extend the findings of our first study, two primary changes were made. First, because we argue that extent of thinking plays an important role in the ease of retrieval effect, we manipulated it to permit more causal conclusions in this regard. Second, we felt it was also important to demonstrate that the findings from Study 1 were not limited to the precise nature or content of the thoughts we asked participants to generate. Therefore, participants in Study 2 were asked to list positive thoughts in response to the message. Again, instructions were adapted from those used by Killeya and Johnson (1998). In Study 2, we expected that individuals in high-elaboration conditions would demonstrate the ease effect, such that they would have more favorable attitudes after generating a few rather than many positive thoughts. Individuals in low-elaboration conditions, on the other hand, were expected to demonstrate the reverse effect for the number of thoughts listed.

### Method

#### PARTICIPANTS AND DESIGN

The study included 117 undergraduates from Ohio State University who participated in partial fulfillment of a course requirement in an introductory psychology course. Participants were randomly assigned to elaboration likelihood conditions (high or low) and number of thoughts conditions (2 or 10) in a  $2 \times 2$  between-participants design.

#### PROCEDURE

As in the first study, participants were seated in a room with 10 partitioned computer stations. Initial instructions followed those from Study 1, with three exceptions. First, participants were told that the purpose of the experiment would be to determine how positively students would evaluate a committee's proposal to implement senior comprehensive exams. Second, we manipulated the personal relevance of the hypothetical comprehensive exam policy. Third, the arguments used in the message were slightly modified, suggesting this

time that grades would improve if the exams were adopted, implementing the exams would allow the university to take part in a national trend, the average starting salary of graduates would increase, and implementing the exams would allow students to compare their scores with those of students at other universities.

#### INDEPENDENT VARIABLES

*Elaboration condition.* Participants were randomly assigned to either the high- or the low-elaboration condition. Participants in the high-elaboration condition were told that the comprehensive exam policy was being considered for implementation at their own university (Ohio State) beginning in the next academic year. In addition, they were told that they were in a small group of very few participants who were being asked to complete this survey so their responses were very important. Previous research has shown that people are more motivated to think about and elaborate on information both when they perceive it as personally relevant (Petty & Cacioppo, 1979) and when they believe not many people are responsible for evaluating it (Petty, Harkins, & Williams, 1980).

By contrast, participants in the low-elaboration condition were told that the exam policy was being considered for implementation at Oklahoma State University beginning several years in the future. To strengthen the manipulation, these participants also were told that they were in a very large group of participants being asked to complete the survey. Because these exams were being considered at another university for a more distant point in the future, and because each participant in this condition thought he or she was one of many people evaluating the proposal, participants in this condition would be relatively unmotivated to think about the information in the proposal.

*Number of positive thoughts.* After reading the message, participants were randomly assigned to list either 2 or 10 positive thoughts they had while reading about the exams.<sup>5</sup> The instructions for this manipulation were basically the same as those used in Study 1, except that they referred to positive thoughts rather than counterarguments.

#### DEPENDENT MEASURES

*Attitudes.* Following the thought-generation task, attitudes toward the exam policy were assessed using the same four items used in Study 1. Internal consistency was again quite high ( $\alpha = .94$ ), so responses to each item were averaged to form an overall attitude index.

*Elaboration manipulation check.* Following all other measures, participants were asked to rate the extent to which they had thought deeply about the information

contained in the message. The scale for this question ranged from 1 to 9, anchored at *not at all* and *very much*.

### Results and Discussion

Before conducting analyses on the attitude data, we submitted the manipulation check—participants' self-reported elaboration—to a  $2 \times 2$  ANOVA with elaboration likelihood and number of positive thoughts as the independent variables. The only significant effect to emerge from this analysis was a main effect for elaboration condition,  $F(1, 113) = 4.90, p < .03$ . As expected, participants in the high-elaboration condition reported thinking more deeply ( $M = 6.58, SD = 1.58$ ) than those in the low-elaboration condition ( $M = 5.83, SD = 2.00$ ). No other effects approached significance ( $F_s < 1$ ).

The attitude data were then submitted to the same analysis. No significant main effects emerged ( $F_s < 1$ ) but the analysis did reveal the predicted two-way interaction between number of positive thoughts and elaboration level,  $F(1, 113) = 6.14, p < .02$ . As illustrated in the bottom panel of Figure 1, individuals in the high-elaboration condition favored the exam policy significantly more after listing 2 ( $M = 6.17, SD = 1.84$ ) than 10 ( $M = 5.22, SD = 1.91$ ) positive thoughts,  $F(1, 113) = 3.98, p < .05$ . Individuals in the low-elaboration condition, on the other hand, tended to favor the exams more after listing 10 ( $M = 6.02, SD = 1.80$ ) than 2 positive thoughts ( $M = 5.32, SD = 1.67$ ),  $F(1, 113) = 2.26, p = .13$ .

In this study, we again assessed the argument quality alternative explanation. This explanation suggests that there might have been differences in the quality of thoughts listed across the 2 and 10 thoughts conditions and that the high-elaboration participants were sensitive to these differences, whereas the low-elaboration participants were not. To test this notion, a judge, blind to elaboration condition and our hypotheses, coded participants' thoughts for quality on a 9-point scale anchored at *very low quality* and *very high quality*.<sup>6</sup> The mean quality ratings for each participant were submitted to the same  $2 \times 2$  ANOVA as the other data. This analysis failed to reveal any significant effects,  $F_s < 1$ . Thus, this alternative does not provide a viable account of our findings.

In this study, we conceptually replicated the attitudinal findings from the first study with a two-way interaction between elaboration and number of positive thoughts. Of importance, the predicted results were found despite changes in the operationalization of elaboration, the content of the thoughts participants generated, and the content of the persuasive message they were given. Contrary to our expectations, however, the simple effect for number of thoughts was not significant under low-elaboration conditions in this study and was marginal in the first study. To determine if the simple effects were significant across studies, we analyzed these

effects and computed effect sizes across the first two studies using the meta-analytic procedures outlined by Rosenthal (1984). This analysis revealed that the simple effects were significant across studies for both high- and low-elaboration participants (as determined at 1 *SD* above and below the NC mean in Study 1 and the manipulation in Study 2). That is, high-elaboration participants across studies appeared to rely more on the subjective experience of listing their thoughts, reporting attitudes that were more in line with their thoughts after listing a small rather than large number of them,  $z = 2.70, p < .01, d = .60, r = .29$ . Low-elaboration participants, on the other hand, relied more on the actual number of thoughts listed, reporting attitudes that were more in line with these thoughts after listing a high rather than low number,  $z = 2.42, p < .02, d = .63, r = .30$ . It is also noteworthy that these effects were almost identical in size.

### STUDY 3

The purpose of Study 3 was to provide evidence that ease effects in persuasion are mediated by thought confidence under high-elaboration circumstances. Specifically, we predicted that for participants who were motivated to think, generating a high number of positive thoughts would be difficult and the effect of this difficulty on attitudes would be mediated by the confidence participants had in the thoughts they listed (having less confidence when it is more difficult to generate the thoughts). We also expected to rule out the availability heuristic interpretation of ease effects. That is, we expected that participants' estimates of the number of positive thoughts they actually had (i.e., how many were available) would not mediate the ease effect. To test these predictions, we placed all participants in a high-personal-relevance situation (to increase thinking; Petty & Cacioppo, 1979) and asked them to generate a high or low number of positive thoughts in response to a persuasive message. We also assessed the difficulty participants experienced in generating their thoughts, the confidence participants had in their thoughts, and the number of positive thoughts they perceived they actually had, irrespective of how many they had been asked to list. The computer presented these measures in a random order for each participant. To test our predictions, we conducted two separate path analyses—a full model testing both the thought confidence and availability models and then a reduced model isolating the significant causal pathways from the larger analysis.

### Method

#### PARTICIPANTS AND PROCEDURE

Sixty-four undergraduates from Ohio State University participated in partial fulfillment of a course require-



ment for an introductory psychology course. The procedure was very close to that of Study 2. Everyone received a message in favor of comprehensive exams and some participants were instructed to generate 2 whereas others were instructed to generate 10 positive thoughts in response to the message. One key change was that to maximize power for our critical test of mediation, all participants were placed in high-elaboration conditions that duplicated those from Study 2. We also included new measures (i.e., difficulty, thought confidence, and number estimates).

*Attitudes.* Immediately following the pro-exam message and thought-listing task, attitudes toward the exam policy were assessed using the same four items as in the first two studies. Internal consistency was again quite high ( $\alpha = .95$ ), so responses to each item were averaged to form an overall attitude index.

*Confidence in thoughts.* To assess thought confidence, participants were asked, "Overall, how much confidence did you have in the positive thoughts you listed?" Participants responded to this item on a 9-point scale ranging from *none at all* to *very much*.

*Perceived difficulty.* A single question also was used to assess the difficulty participants experienced generating the requested number of thoughts. This item, based on a measure used in previous research (e.g., Rothman & Schwarz, 1998; Schwarz et al., 1991), asked, "How difficult did you find it to generate the requested number of positive thoughts?" Responses to this item also were provided on a 9-point scale ranging from *not at all difficult* to *extremely difficult*.

*Estimate of number of thoughts.* One item assessed the number of positive thoughts participants believed they had toward comprehensive exams: "Type in the actual number of positive thoughts you would estimate you had on your own." This item was open-ended and responses ranged from 1 to 15 ( $Mdn = 5.0$ ).

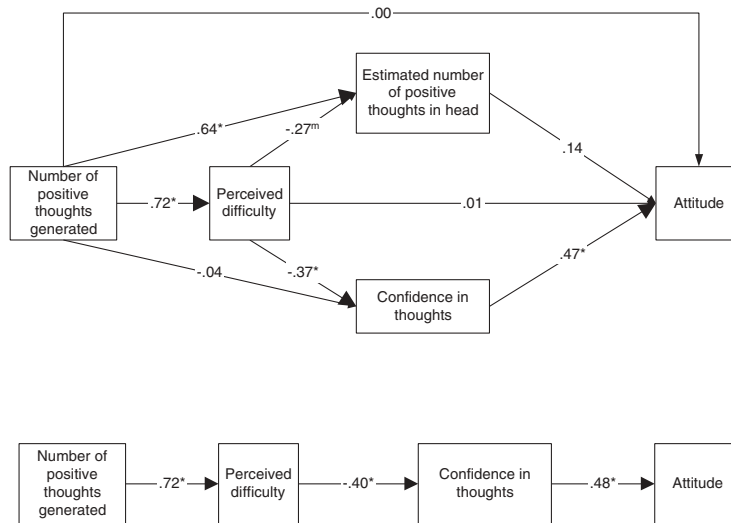
### Results and Discussion

Prior to estimating the predicted structural equation models of the data, we placed all variables on a common 0-1 scale and dummy coded our manipulation of number of thoughts such that 0 = 2 thoughts and 1 = 10 thoughts. Using RAMONA (Browne & Mels, 1998), we then tested two path models—one model that simultaneously tested the mediation proposed by both the thought confidence hypothesis and the availability heuristic and then a reduced model that tested the significant mediational path from the first model. RAMONA provides several indices of model fit, including a chi-square goodness-of-fit index and root mean square error of approximation (RMSEA) (Browne & Cudek, 1993). The chi-square fit index provides a test of statistical sig-

nificance whereby significant values indicate poor fit and nonsignificant values indicate better fit. RMSEAs can be interpreted similarly, with lower values indicating better fit, but these values also account for model complexity, giving preference to simpler models when all else is equal. In general, RMSEAs greater than .10 indicate unacceptable fit. Finally, we report the non-normed fit index (NNFI) (Bentler & Bonnett, 1980), which compares the specified model to a null model that specifies no interrelationships among the manifest variables. NNFI values greater than .90 indicate good fit.

We began our analyses by specifying the model in the top panel of Figure 2. This model allowed us to pit the availability heuristic and thought confidence models against each other. As expected, the number of positive thoughts they were requested to generate had a significant direct effect on perceived difficulty—participants asked to generate 10 thoughts found it more difficult than participants asked to generate 2 thoughts. Perceived difficulty had an inverse effect on confidence in thoughts such that the more difficult participants perceived the thought generation task to be, the less confidence they had in their thoughts. Finally, thought confidence had a direct effect on attitudes, which is to be expected when the thoughts are favorable. This pattern supports the self-validation perspective. The only other significant effect to emerge was a direct effect of number of positive thoughts generated on participants' perceived number of positive thoughts. That is, participants in the 10 thoughts condition thought they had more positive thoughts in general than participants in the 2 thoughts condition. Of interest, perceived difficulty also had a marginal negative effect on perceived number of thoughts,  $p < .10$ , consistent with the availability notion that people infer number from ease of retrieval, but perceived number of thoughts did not ultimately affect attitudes. No additional paths were significant in this model. Overall, this model did not fit the data well. Lack of fit was indicated by a significant chi-square value,  $\chi^2(1, N = 64) = 4.43, p < .05$ , a large RMSEA value (.23), and a low NNFI (.60).

Because the first model did not evince good fit, we respecified a model that included only the significant causal pathways. As illustrated in the bottom panel of Figure 2, this was the thought confidence model. This model fit the data quite well,  $\chi^2(3, N = 64) = .59, ns$ , RMSEA = .00, NNFI = 1.07. Moreover, all the estimated parameters were significant and consistent with the predictions. In short, participants (all assigned to high-elaboration conditions) experienced greater difficulty in generating 10 than 2 positive thoughts. The impact of perceived difficulty on attitude ratings was mediated by the confidence people had in the thoughts they generated. When it was easy to generate the thoughts (because



**Figure 2** Full model (top) and thought confidence model (bottom) from Study 3.  
<sup>m</sup> $p < .10$ . \* $p < .05$ .

only two were requested), participants had more confidence in their thoughts and thus formed attitudes that were more consistent with them (i.e., favorable). When it was more difficult to generate the thoughts (because 10 were requested), thought confidence decreased, making it less likely that they would form attitudes that were consistent with them.

These data provided support for the thought confidence model of ease of retrieval effects. Consistent with prior work in this area, generating a high number of thoughts was perceived as more difficult than generating a low number of thoughts. Consistent with the self-validation hypothesis, however, the effect of this difficulty on attitudes was mediated by the confidence individuals reported having in the thoughts they generated, not participants' inferences about how many positive thoughts they must have had.<sup>7</sup>

Of course, a caveat to these findings should be noted. That is, it is difficult to determine whether the absence of mediation through the number estimate measure represents the genuine absence of this effect in reality or the potential shortcomings of our measure. It is possible that a different measure (e.g., one ascertaining the estimated number of positive thoughts that exist in the universe, or that could hypothetically be generated) would have been more sensitive to the availability heuristic effect. Thus, our positive evidence in favor of the self-validation hypothesis is more compelling than is our null evidence regarding the availability heuristic. Future studies that include different and potentially better measures of the availability construct are warranted.

#### GENERAL DISCUSSION

Prior researchers have suggested that subjective experience (i.e., the ease of retrieval) is used as a heuristic in the judgment process under conditions in which extensive thought is unlikely (e.g., Grayson & Schwarz, 1999; Rothman & Schwarz, 1998). Along with Wänke and Bless (2000), the current studies challenge this notion and suggest instead that subjective experiences associated with thoughts are taken into account primarily under high-elaboration circumstances. These findings are consistent with the self-validation hypothesis (Petty et al., 2002), which suggests that it is primarily under high-elaboration conditions (e.g., high need for cognition or high personal relevance) that individuals have the motivation to attend to their cognitive phenomenology.

In three studies, our data were consistent with the self-validation perspective. Using an adaptation of the ease of retrieval paradigm, we found in one study that high-elaboration participants opposed a new policy more after generating few rather than many arguments against a message supporting the policy, whereas low-elaboration participants showed the opposite effect. This study provides the first demonstration that experienced ease of generating arguments can decrease persuasion under high-elaboration conditions. In Study 2, we found that high-elaboration participants favored a new policy more after generating few rather than many positive thoughts in response to a message supporting the policy. Again, low-elaboration participants tended to show the opposite results, reporting more thought-congruent attitudes after generating a high number of

such thoughts, apparently treating number as a simple cue. Together, these findings provided the first evidence that under high-elaboration conditions people will rely on the subjective experience of ease of generation to a greater extent than the actual amount of information they generated. In Study 3, we showed for the first time that these ease effects were mediated by the confidence participants had in the thoughts they listed in response to the persuasive message.

Of interest, other recent applications of ease of retrieval effects can be viewed as consistent with this conceptualization. Dijksterhuis et al. (1999), for instance, found that stereotyping can be influenced by ease of retrieval of stereotypic traits of an outgroup, but only for individuals low in prejudice. Dijksterhuis et al. argued that for high-prejudice individuals, it is easy to recall both a low and high number of stereotypic traits, and their unfavorable attitudes toward the outgroup are too strong to be influenced by momentary and extraneous factors (see also Haddock et al., 1999). Research by Petty, Fleming, and White (1999), however, suggests an additional explanation that is consistent with the present findings. Petty et al. (1999) found that people low in prejudice are more motivated to thoughtfully process information from a stigmatized source to prevent biases from influencing their judgments. It is possible that the low-prejudice individuals in the Dijksterhuis et al. (1999) study were motivated to process information carefully to make unbiased judgments. This heightened level of elaboration might have turned some of their attention to their subjective experience, increasing or decreasing their confidence in the stereotypic traits they were listing, and affecting the stereotypicality of their judgments accordingly. Future research extending the self-validation framework to ease of retrieval effects in other domains would be useful.

#### *Ease of Retrieval and Bias*

The present results raise interesting questions regarding the informational utility of one's subjective experience versus the content of one's thinking. The implicit assumption of prior work in this domain, and the conclusion drawn explicitly by Rothman and Schwarz (1998), is that a reliance on subjective experience renders a judgment more error-prone. That is, it has been assumed that subjective experience is somehow misleading and biased and that under more thoughtful circumstances people will be less susceptible to this bias. But is this necessarily the case? We have demonstrated that it is people higher in motivation to think who use this information most. This does not demonstrate that subjective experience is a more objective source of information than the content of cognition. Indeed, it is already apparent from prior work that highly elaborated (thoughtful) processing can

be biased (e.g., Chaiken & Maheswaran, 1994; Petty, 2001; Petty, Schumann, Richman, & Strathman, 1993). The present findings do suggest, however, that inducing more thoughtful processing is not necessarily a way to rid people of the ease of retrieval bias. On the contrary, it appears that more motivated thinkers are particularly susceptible to the effects of subjective cognitive experiential information. This conclusion is consistent with a great deal of persuasion research indicating that highly elaborative processing is often more susceptible to certain biases than less elaborative processing (for reviews, see Eagly & Chaiken, 1993; Petty & Cacioppo, 1986; Petty & Wegener, 1999).

#### CONCLUSIONS

Recent work on the self-validation hypothesis (Petty et al., 2002) suggests that individuals who are highly motivated to think are also attentive to their subjective feelings of confidence about their thoughts. The current work shows that aspects of subjective experience (i.e., ease of retrieval) can influence the confidence people have in their thoughts, at least for individuals attuned to that experience (i.e., those under high elaboration). Our findings are inconsistent with the previous notion that ease of retrieval has simple heuristic value mostly for individuals low in motivation to think. In fact, our research suggests that the traditional ease of retrieval effect may not be heuristic in nature at all. Instead, it appears that the subjective experience of ease or difficulty can have a more complex effect on judgments through individuals' personal assessments of the confidence they have in their own thinking and their subsequent willingness to rely on this thinking in forming judgments.

Future research might examine whether different types of elaboration (e.g., motivation vs. ability to thoughtfully process) influence ease of retrieval effects differentially. High-ability thinkers, for instance, might be less likely to perceive certain tasks as subjectively difficult and could therefore evince a different pattern of results. Perhaps extensive thought stemming from ability factors would actually reduce reliance on ease of retrieval. Addressing this issue would be a useful next step for research on subjective experience and ease of retrieval. Also useful would be future consideration of the possibility that the impact of elaboration on ease effects could at some point become curvilinear in nature. Indeed, under extremely high-elaboration conditions, people might consider both the subjective experience of ease and the actual number and quality of thoughts generated before making their final judgments. Mentally pitting these factors against one another would be expected to attenuate ease (and other) effects for this group of individuals. Exploring the

upper limits, or boundary conditions, of the current findings would be an important undertaking in future research.

#### NOTES

1. In another line of work, Haddock, Rothman, Reber, and Schwarz (1999) examined the effects of ease manipulations on attitude rather than thought confidence and found that subjective ease was associated with increased confidence in attitudes. Haddock et al. derived the attitude confidence hypothesis from the availability heuristic because people might reasonably have more confidence in their attitudes if there are perceived to be many rather than few arguments supporting them. The current research examines the effects of ease of generation on thought rather than attitude confidence. Although attitude confidence and thought confidence have some relation, they are independent constructs (Petty, Briñol, & Tormala, 2002). Notably, whereas attitude confidence effects in the ease paradigm are readily derived from the availability heuristic, thought confidence effects are not. That is, greater perceived knowledge available in general should not affect confidence in any individual component of that knowledge.

2. In other recent research, Grayson and Schwarz (1999) also concluded that ease effects are more likely to occur under relatively low-processing conditions. However, this research is subject to some of the same ambiguities as the Rothman and Schwarz (1998) work. Specifically, Grayson and Schwarz operationalized level of processing in terms of an individual difference variable that may be confounded with factors such as prior experience and knowledge. Thus, it was unclear as to whether level of processing or some other variable moderated the key effects.

3. To identify the number of arguments to use in this manipulation, we pretested 15 people, who generated an average of 4.33 counterarguments to our pro-exam message. We also asked pretest participants how many arguments they could generate easily, and the mean was 3.73. Based on these numbers, we selected two and eight to make the task seem very easy or difficult, respectively. All participants in both conditions completed the thought-listing task.

4. To ensure that the judge's ratings were reliable, we asked a second judge to rate the counterarguments of 20 randomly selected participants from Study 1. The quality scores produced by the second judge were highly correlated with those of the primary judge,  $r = .85$ ,  $p < .001$ . Thus, the primary judge's ratings were deemed reliable and were used in analyses.

5. We increased the number of thoughts listed in the "difficult" condition to 10 in this study for two reasons. First, pretest data for 14 individuals suggested that participants generated an average of 5.29 positive thoughts in response to the pro-exam message, almost 1 thought higher than the average for counterarguments in Study 1. Pretest individuals also said that, on average, they could easily generate 4.32 positive thoughts, slightly greater than the number reported for counterarguments. Second, the persuasive message contained two strong and two weak arguments. If the message had contained four weak arguments, eight positive thoughts might have been sufficiently difficult. Because the two strong arguments likely provoked positive thoughts, however, we increased the number of thoughts generated to maintain an adequate level of difficulty in this condition. As in Study 1, all participants completed the thought-listing task.

6. As in Study 1, we asked a second judge to rate the thoughts listed by 20 randomly selected participants. The quality scores produced by the second judge were again highly correlated with those of the primary judge,  $r = .90$ ,  $p < .001$ , which were thus considered reliable.

7. Although all participants in Study 3 were placed in a high-thinking context, we also had data from Study 3 on participants' self-reported level of elaboration (e.g., questions asking participants how deeply they thought about the message). We formed a composite measure of self-reported elaboration to see if those highest in elaboration showed ease of retrieval effects most strongly (as in Studies 1 and 2). We conducted a hierarchical regression analysis, predicting attitudes, with

self-reported elaboration, number of positive thoughts (dummy-coded), and the interaction term (i.e., cross-product) as the predictors. This analysis revealed a significant two-way interaction between elaboration and number of positive thoughts,  $\beta = -1.32$ ,  $t(3, 60) = -2.21$ ,  $p < .04$ , such that the ease effect was most prominent among those whose self-reported elaboration was the highest.

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