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Thought Confidence as a Determinant of Persuasion: The Self-Validation Hypothesis

Richard E. Petty
Ohio State University

Pablo Briñol
Universidad Autónoma de Madrid

Zakary L. Tormala
Ohio State University

Previous research in the domain of attitude change has described 2 primary dimensions of thinking that impact persuasion processes and outcomes: the *extent* (amount) of thinking and the *direction* (valence) of issue-relevant thought. The authors examined the possibility that another, more meta-cognitive aspect of thinking is also important—the degree of *confidence* people have in their own thoughts. Four studies test the notion that thought confidence affects the extent of persuasion. When positive thoughts dominate in response to a message, increasing confidence in those thoughts increases persuasion, but when negative thoughts dominate, increasing confidence decreases persuasion. In addition, using self-reported and manipulated thought confidence in separate studies, the authors provide evidence that the magnitude of the attitude–thought relationship depends on the confidence people have in their thoughts. Finally, the authors also show that these *self-validation effects* are most likely in situations that foster high amounts of information processing activity.

Social psychologists have long been interested in what determines attitude change. The early experimental researchers focused on the extent to which the audience was able to comprehend and retain the information contained in a persuasive message (e.g., Hovland, Janis, & Kelley, 1953; Hovland, Lumsdaine, & Sheffield, 1949). Later, it was shown that the ability to learn the information (e.g., message arguments) was often not as important in attitude change processes as how individuals cognitively responded to or elaborated on that information (e.g., Brock, 1967; Greenwald, 1968; McGuire, 1964; Petty, Ostrom, & Brock, 1981).

In the elaboration likelihood model (ELM; Petty & Cacioppo, 1981, 1986; Petty & Wegener, 1999) and the heuristic–systematic model (Chaiken, Liberman, & Eagly, 1989; Chen & Chaiken, 1999) of persuasion, as in much of the contemporary attitude change literature, two primary aspects of thinking have been emphasized. First, investigators have explored determinants of the *extent* of thinking. That is, what determines whether people think a lot or relatively little about some attitude object? Research has shown that some variables have an impact on the extent of thinking by varying a person's *motivation* to think about the issue (e.g., increasing the personal relevance of the message enhances thinking; Petty & Cacioppo, 1979), whereas other variables have an impact on a person's *ability* to think about the issue (e.g., increasing distraction reduces message processing; Petty, Wells, & Brock, 1976). There is considerable agreement in contemporary models of persuasion that the extent of thinking can be understood as a continuum ranging from low to high amounts of message-relevant thought (e.g., Chaiken, Duckworth, & Darke, 1999; Kruglanski & Thompson, 1999; Petty, Wheeler, & Bizer, 1999).

The second aspect of thinking that has garnered considerable research attention is the *content* of thought. Perhaps the most extensively explored content dimension is the overall valence of the thinking that occurs, though other content dimensions have been explored as well (see Cacioppo, Harkins, & Petty, 1981). That is, researchers often investigate whether thoughts in response to a message are favorable, unfavorable, or neutral. Attitude change is postulated to be a function of the dominance of one type of response over the others. To the extent that a variable enhances favorable thoughts or reduces unfavorable thoughts (e.g., counterarguments), increased persuasion should result. Experimental research is consistent with this view and has shown that the polarity of these thoughts (e.g., positive minus negative thoughts) is a good predictor of postmessage attitude change, especially when motivation and ability to think are high (see reviews by Eagly & Chaiken, 1993; Petty & Cacioppo, 1986).

Richard E. Petty and Zakary L. Tormala, Department of Psychology, Ohio State University; Pablo Briñol, Department of Methodology and Social Psychology, Universidad Autónoma de Madrid, Madrid, Spain.

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Correspondence concerning this article should be addressed to Richard E. Petty, Department of Psychology, Ohio State University, 1885 Neil Avenue Mall, Columbus, Ohio 43210-1222. E-mail: petty.1@osu.edu.

A number of variables have been shown to influence the content or valence of thoughts. Perhaps the most frequently examined variable in this regard is the quality of the arguments contained in the persuasive communication (e.g., Petty & Cacioppo, 1986; Petty et al., 1976). Other variables have been shown to influence thought content as well. For example, when motivation and ability to think are high, people generate more positive thoughts when they are in a positive rather than a neutral mood (Petty, Schumann, Richman, & Strathman, 1993) and when the message is presented by a source of high rather than low credibility (Chaiken & Maheswaran, 1994).

It is interesting that another possible dimension of thinking—metacognition—though receiving considerable attention outside the domain of attitude change, has been relatively neglected by persuasion researchers. Metacognition refers to people's awareness of and thoughts about their own or others' thoughts or thought processes (i.e., cognition about cognition; see Jost, Kruglanski, & Nelson, 1998). The primary goal of the current article is to argue for the conceptual importance and utility of examining the impact of one metacognitive factor—thought confidence—in attitude change processes.

Metacognitive Responses in Persuasion

The idea that people evaluate or assess their thoughts or thought processes is prevalent in a number of psychological domains. For example, in the domain of human memory, research has found that the stronger one's feeling of knowing about an elusive name is, the more time one is likely to spend searching for the name before giving up (e.g., Costermans, Lories, & Ansay, 1992; Koriat & Goldsmith, 1996; Nelson & Narens, 1990). The urge to bring the search to an end is all the more intense when one feels that the name is on the tip of the tongue and is about to emerge into consciousness (Yzerbyt, Lories, & Dardenne, 1998). Metacognitive phenomena are also important in some forms of clinical practice. Indeed, the main goal of cognitive–behavior therapy is to get individuals to decrease the perceived validity of negative or irrational thoughts by questioning these thoughts or assessing the evidence for them (e.g., Beck & Greenberg, 1994; A. Ellis, 1962).

The role of thought confidence in judgment also figures prominently in some social–cognitive theories. Most notably, Kruglanski's (1989) lay epistemic theory (LET) emphasizes a two-phase sequence of thinking in which hypotheses (i.e., beliefs) are first generated and then validated. LET was developed to understand the problem of attribution of causality (Kruglanski, 1980). The generation of causal hypotheses was said to depend on a person's motivation and ability to do so (Kruglanski, 1990). For example, a person with a high need for closure (Kruglanski & Webster, 1996) might be motivated to generate few rather than many causal hypotheses to explain an event. According to LET, hypothesis validation should depend primarily on the extent to which the hypothesis is consistent with the available evidence and the number of competing hypotheses generated. For example, the more alternative explanations are generated for any given event, the less confidence a person has in any one of them. The parallels to prevailing analyses of the processing of persuasive messages should be clear. That is, as noted earlier, considerable research has already demonstrated that, like hypothesis generation, thought generation is guided by a person's motivation and ability to think (Petty & Cacioppo, 1986). What has not been examined, however, is whether a person's issue-relevant thoughts are subjected to a validation process subsequent to generation and, if so, what the attitudinal implications of this validation process are.

Despite the widespread recent focus on the role of metacognition in various social phenomena (e.g., Bless & Forgas, 2000; Jost et al., 1998; Yzerbyt et al., 1998), the role that metacognitive factors might play in persuasion has received little attention. Given the prominence that cognitive processes have assumed in understanding attitude change, it is surprising that research on metacognition is essentially absent from this literature.[1] Consistent with LET (Kruglanski, 1990), one metacognitive factor that might have considerable importance is the extent to which people have confidence or doubt in the validity of their own thoughts about an attitude issue. We hypothesize that when one's attitude-relevant thoughts are perceived as valid, they should have a strong impact on attitudes, but when one's attitude-relevant thoughts are perceived as invalid, they should not. Applying this *self-validation hypothesis* to persuasion suggests that confidence in one's own thoughts could conceivably increase or decrease attitude change depending on the nature of the thoughts elicited by the persuasive communication. That is, when the thoughts in response to a message are primarily favorable, increasing confidence in their validity should increase persuasion, but increasing doubt about their validity should decrease persuasion. When thoughts are primarily unfavorable, however, increasing confidence in their validity should decrease persuasion, but increasing doubt about their validity should increase persuasion. Thus, the metacognitive factor of confidence should interact with thought valence in determining persuasion.

In addition to the valence of one's thoughts (i.e., whether they favor or disfavor the advocacy), we noted earlier that persuasion also depends on the number of cognitive responses generated about the message—the extent of elaboration. Thus, another important question concerns possible interactions of thought confidence with the extent of thinking. On the low end of the elaboration continuum, people tend to engage in little thought or simpler thought. Metacognitive thought, however, may require more effort. For example, metacognitive beliefs such as "I'd rather not think like this" or "something is wrong with this thought" appear to involve some conscious control (Wegner, 1989). The translation from the metacognitive level back to the object level also requires extra attention and mental control. Thus, it seems likely that metacognition requires some mental effort and cognitive elaboration (at least until such thinking becomes routinized; Smith, Stewart, & Buttram, 1992).

In accord with this reasoning, we hypothesized that the impact of metacognitive factors depends not only on the direction of people's thoughts but also on the extent to which people are motivated and able to elaborate on the information presented. That is, people's evaluations of the validity of their own thoughts should have an impact on persuasion, particularly when they have the

[1] One notable exception concerns research on correction processes or people's naive theories of their persuasion biases (e.g., Petty, Wegener, & White, 1998; Wilson, Houston, & Meyers, 1998). This research does not address people's thoughts about their issue-relevant thoughts, however.

motivation and ability to first generate thoughts about the message and then assess the validity of their thoughts.

Support for the Self-Validation Hypothesis

Although no prior work has examined the impact of thought confidence on persuasion, some past research is compatible with the idea that thought confidence should matter. First, indirect support is provided by past research on attitude confidence. That is, the proposed relationship between thought confidence and attitudes in many ways parallels the relationship between attitude confidence and corresponding behavior (for a review, see Gross, Holtz, & Miller, 1995). Attitude confidence is defined in this context as a subjective sense of conviction or validity regarding one's attitudes (Festinger, 1950, 1954). Similarly, thought confidence refers to a sense of conviction or validity regarding one's thoughts. Although there are many implications of attitude confidence (e.g., attitudes held with confidence tend to be difficult to change; see Babad, Ariav, Rosen, & Salomon, 1987; Krosnick & Abelson, 1992; Swann, Pelham, & Chidester, 1988), the most relevant for the current research is the notion that the more confident one is in one's attitude, the more that attitude is predictive of behavior (e.g., Fazio & Zanna, 1978a, 1978b). Just as confident attitudes are more likely to guide behavior, we suggest that confident thoughts are more likely to guide attitudes.

Some research is more directly relevant to the idea that variation in thought confidence has an impact on attitudes. In one study, for instance, Hedges (1974) gave people false feedback designed to manipulate their perception of their own abilities to counterargue a persuasive message. Specifically, after being instructed to list ideas against a proposal, participants were told that several judges had rated their ideas as either effective or ineffective in refuting the communication. Results showed that this manipulation influenced acceptance of the message. When participants were led to believe that their ability to counterargue was relatively high, they showed less attitude change than when they were led to believe that their ability to counterargue was relatively low. Although this research was designed to examine the influence of the participants' perceptions of their ability to counterargue rather than their perceptions of their individual counterarguments, it is possible that the manipulation used could have affected the confidence or doubt that participants had in the negative thoughts they generated. Unfortunately, no measure of the confidence with which participants held their cognitive responses was taken in this research. More problematic, however, is that there is a plausible alternative explanation of the results based on the experimental demands of the situation. That is, because the experimenter directly gave participants feedback about how good they were at counterarguing a message, participants could easily have imagined what the experimental goal was and responded accordingly. Thus, perceptions of one's thoughts (or abilities) might not have been responsible for the persuasion outcome. Finally, even if these issues were not present, no attempt was made in this research to examine the consequences of people's perceptions of their *favorable* thoughts (or their proarguing abilities). Because of this, it is possible that enhancing one's confidence increases resistance regardless of the target of the confidence. Thus, a clear test of the self-validation hypothesis was not provided.

Other relevant studies did not attempt to manipulate metacognitive factors but instead measured people's perceptions of their attitude-relevant thoughts. For example, Calder, Insko, and Yandell (1974) had people rate their thoughts for extremity, but this did not improve the correlation with attitudes (see also Cullen, 1968). Of greater relevance to the current conceptualization, Petty (1977) had individuals rate the perceived validity of their positive and negative thoughts in response to a message and showed that when valenced thoughts were weighted by perceived validity, prediction of attitudes from thoughts was increased. No attempt was made to see how perceived validity related to attitude change, however. Thus, although prior work can be viewed as somewhat supportive of the general self-validation idea, the hypothesis that thought confidence can predict attitude change beyond the number and valence of thoughts has not been examined directly.

Overview of the Present Research

In short, the present research was conducted to test directly whether and when self-validation processes affect persuasion. According to the self-validation hypothesis, confidence in one's thoughts can increase or decrease persuasion depending on the nature of the thoughts elicited by the message. When cognitive responses to a persuasive message are mostly negative, increasing confidence in those thoughts should enhance resistance to the message. When cognitive responses are mostly positive, on the other hand, increasing confidence should enhance persuasion. As detailed earlier, we expected these differences to emerge mostly under high elaboration circumstances, as sufficient motivation and ability to think and attend to thinking must be present for metacognitive processes to have an impact.

If the self-validation hypothesis is supported, it is a potentially important addition to the attitude change literature. Prior research has shown clearly that thoughts are more predictive of attitudes under high than under low elaboration conditions (e.g., Chaiken, 1980; Petty & Cacioppo, 1979), but even under high elaboration conditions, attitude–thought correlations are often only modest (e.g., .50 to .60; see Petty & Cacioppo, 1986, for a review). The self-validation hypothesis suggests, however, that the typical correlations reported under high elaboration conditions may conceal additional and previously unrecognized differences that exist between individuals who have relatively high versus relatively low confidence in their thoughts. It may be that attitude–thought correlations are actually higher for individuals with high confidence in their thoughts and lower for individuals with low confidence in their thoughts.

In addition, if the self-validation hypothesis is confirmed, there are implications for a new conceptual understanding of a diversity of attitude change phenomena. That is, variations in thought confidence might provide a plausible alternative explanation for a number of attitude change effects that had been attributed previously to other mechanisms. As one example, consider classic work on the sleeper effect, whereby a message that is initially ineffective gains in impact over time (e.g., Kelman & Hovland, 1953). Contemporary research strongly indicates that the sleeper effect is most likely to occur when people first receive a compelling message that is then discredited by being declared false or associated with a low-credibility source (Pratkanis, Greenwald, Leippe, & Baumgardner, 1988). The most prominently mentioned account

for the increased impact of this discredited message over time is that people disassociate the discrediting cue from the message position (e.g., Cook, Gruder, Hennigan, & Flay, 1979). However, it is possible that self-validation processes are also at work. That is, a person might have many favorable thoughts to a strong message but lose confidence in these thoughts when the message is discredited (e.g., "Everything I was thinking must be wrong"). Over time, however, the person's confidence in his or her own thoughts might increase again, thus restoring the impact of the message.

We conducted four studies to assess the self-validation hypothesis. In each study, participants generated cognitive responses in varied directions to a persuasive communication. To assess the influence of thought confidence on the persuasion process, in two studies we measured thought confidence, and in two we manipulated it. We used this hybrid strategy to obtain converging evidence for the impact of confidence. A strategy of measuring confidence alone is subject to the criticism that it does not provide evidence for a *causal impact* of confidence. But a strategy of manipulating confidence alone is subject to the criticism that no manipulation can capture confidence as it exists in its natural state. To the extent that both strategies produce the same outcome, the validity and utility of our results are enhanced.

Study 1

Study 1 was designed to provide an initial examination of the role that thought confidence plays in persuasion. In this study, we also sought to distinguish thought confidence from other properties of thoughts that have already been examined in the literature. Most notably, expectancy-value theories hold that any given thought a person might have in response to a persuasive message, such as "Raising tuition could improve the library," can be decomposed into two salient components (Fishbein & Ajzen, 1975, 1981). First, the perceived *desirability* of the consequence mentioned in the thought is important (i.e., how good or bad is it to have improvements in the library?). Second, the perceived *likelihood* of the consequence is critical (i.e., how likely is it that raising tuition will improve the library?). The impact of any belief on attitudes is postulated to be a product of the expectancy (i.e., likelihood) and the value (i.e., desirability) of the consequence (i.e., Expectancy $\times$ Value). Because these components of beliefs have already proven important in understanding attitudes (Fishbein & Ajzen, 1975) and persuasion (Petty & Wegener, 1991; Wegener, Petty, & Klein, 1994), it is essential to distinguish thought confidence from them.

As noted earlier, thought confidence refers to an individual's subjective assessment of the validity of his or her own thought. Thus, thought confidence can be distinguished conceptually from likelihood and desirability as used in expectancy-value theories. A person might lack confidence in the thought that raising tuition could improve the library for many reasons. First, the person might not be sure exactly how likely an improvement is. It could be very likely or not so likely. Second, even if the person was certain that the likelihood of improvement was .70, he or she might be uncertain about how desirable an improvement is. An improvement might be a great thing or not so great a thing. In short, having high (or low) confidence in one's thought does not imply that an improvement to the library is better or worse or that it is more or less likely to occur.

In addition to these dimensions, thought confidence might be related to other features of one's thoughts, such as the amount of actual or perceived knowledge supporting the thought or the credibility of the source of the message, independent of the perceived likelihood or desirability of the consequence expressed in the thought. Nevertheless, despite good reasons to assume conceptual independence of these constructs, Study 1 sought to demonstrate empirical separation. That is, we sought to show that thought confidence accounted for variance in attitudes beyond the likelihood and desirability components of thoughts.

In Study 1, all participants received a persuasive message about a proposed senior comprehensive exam policy at their university. They were asked to think carefully about this policy and to list what they thought might be some of its consequences. Following this task, participants reported the confidence they had in the consequences they listed as well as how likely and desirable they thought each consequence was. Finally, we assessed participants' attitudes toward the exam policy. In accord with the self-validation hypothesis, we expected to find that the relationship between thoughts (i.e., direction of consequences) and attitudes was greater to the extent that confidence was relatively high rather than low. Furthermore, although we expected to find some correlations among thought confidence, likelihood, and desirability, we did not expect likelihood or desirability to account for the effects of thought confidence.

Method

Participants and Procedure

Fifty-eight undergraduates in introductory psychology classes at Ohio State University participated in partial fulfillment of a course requirement. On arrival, participants were seated at individual computer stations and were presented with all of the materials on the computer using MediaLab 2000 software (Jarvis, 2000). Participants were told that they were helping out with research designed to assess possible changes in Ohio State University policies. They read about a new school policy and were told that students' opinions of this policy were of great importance to the university. All participants were told that Ohio State University was considering the possibility of instituting senior comprehensive exams in students' major areas for next year and that the university's board of trustees wanted to gauge students' reactions. Along these lines, participants were told that we would be asking them to provide their thoughts about what the consequences of this new policy might be. We used a topic of high personal relevance for the participants to motivate them to thoughtfully process the information (Petty & Cacioppo, 1979).

All participants received a message in favor of the comprehensive exams containing two strong arguments (e.g., the exams would improve the average starting salary of graduates from the university) and two weak arguments (e.g., the exams motivate students to study by increasing anxiety). The arguments selected were adapted from previous research (see Petty & Cacioppo, 1986, for a review). After reading the message, participants used the computer keyboard to enter their thoughts about the consequences of comprehensive exams in a series of boxes that appeared on the computer screen one at a time. After entering each thought, participants pressed *enter* to move to the next screen, where another box appeared. They pressed the *escape* key when they had finished. Participants were allowed to enter a maximum of four thoughts. They were told to write one thought per box and not to worry about grammar or spelling (see Cacioppo & Petty, 1981, for additional details on the thought listing procedure). Following this procedure, participants were exposed to each of the consequences of senior comprehensive exams they had listed (one at a

time) and were asked to rate each one in terms of its overall valence (positive, negative, or neutral) as well as confidence, likelihood, and desirability (see descriptions of measures below). Finally, participants were told that because their personal views on the senior comprehensive exam topic might have influenced their responses to the earlier questions, it was important to know what their opinions on the topic were.

Thought Measures

Valence of thoughts. As mentioned above, participants were provided with four blank boxes to list their thoughts about the consequences of comprehensive exams. Participants later rated their thoughts one by one as positive, negative, or neutral toward comprehensive exams. Some examples of positive thoughts participants listed included, "students will study more," "better teacher–student interaction," and "a higher salary for new employees." Some examples of negative thoughts included, "unnecessary competition," and "higher anxiety among graduating students."

Thought confidence. Participants were next asked to rate the extent to which they had confidence in the validity of each thought listed. Thought confidence was rated on a 9-point scale anchored at *not at all confident in this thought* (1) and *extremely confident in this thought* (9).

Likelihood. Participants then rated each thought on a 9-point scale of likelihood. Specifically, participants were asked to think about how likely each of the consequences they listed was to occur if the exams were instituted. They were then presented with each consequence listed and rated each one on a scale anchored at *not at all likely to occur* (1) and *extremely likely to occur* (9).

Desirability. Finally, participants rated each thought in terms of its desirability as well. Participants were instructed to think about how desirable each of the listed consequences was. They then saw each thought one by one and rated it on a scale anchored at *not at all desirable* (1) and *extremely desirable* (9).

Attitudes

Following all thought ratings, participants' attitudes toward the senior comprehensive exams were assessed using a series of six 9-point (1–9) semantic differential scales (i.e., against–in favor, unfavorable–favorable, bad–good, foolish–wise, negative–positive, beneficial–harmful). Ratings on the different scales were highly intercorrelated ($\alpha = .94$) and were thus averaged to create a composite attitude index.

Results

Thought Confidence

Before assessing the relationships between thought confidence and the other predictors, we created a participants variable using dummy coding. Dummy coding this variable allowed us to group the four consequences listed by each participant as a single category. We then entered the dummy-coded participants variable into a simultaneous regression analysis with thought valence, likelihood, desirability, and the order in which the thoughts were listed as additional predictors. It is important to note that dummy coding the participants variable allowed us examine within-subject effects in the regression analysis. It corrected the degrees of freedom, accounted for individual-differences variability, and offered a more precise error term (see Pedhazur, 1982, for information regarding this approach). This analysis revealed several noteworthy effects. First, confidence had significant positive relationships with both likelihood ($\beta = .18$, $p < .02$) and desirability ($\beta = .49$, $p < .001$). That is, as the perceived likelihood and desirability of the consequences listed increased, so too did the participants' confidence in the thought. It is interesting that there was also a marginal negative effect of the order in which the consequences were listed ($\beta = -.10$, $p < .07$), suggesting that participants became less confident about each successive thought listed. Thought valence did not predict thought confidence ($\beta = -.10$, $p = .25$). Finally, we also computed an interaction term (i.e., Likelihood $\times$ Desirability) and entered this term as a second step in a hierarchical regression analysis. The interaction term did not predict confidence ($\beta = -.06$, $p = .37$).[2]

Attitudes

For the attitude data, we approached the analyses somewhat differently. In this case, because attitudes were only reported once (i.e., not once per thought, as with the other measures), we formed composite indices of the thought confidence, likelihood, and desirability measures, averaging the respective responses across thoughts. In addition, as an index of overall thought valence, we subtracted the number of negative thoughts from the number of positive thoughts for each participant and divided the difference by the total number of thoughts (four). Responses to the semantic differential attitude scales were scored such that higher values represented more favorable attitudes toward the proposal. Prior to analysis of the attitude data, all variables were standardized. These data were then submitted to a hierarchical regression analysis, with main effects interpreted in the first step, two-way interactions in the second step, three-way interactions in the third step, and the four-way interaction in the final step (Cohen & Cohen, 1983).

This analysis revealed a main effect for valence of thoughts on attitudes, $\beta = .59$, $t(53) = 3.67$, $p = .001$. Consistent with much prior research on cognitive responses, as thought positivity increased, attitudes toward comprehensive exams became more favorable (Petty, Ostrom, & Brock, 1981). None of the other predictors had a significant relationship with attitudes on their own (ps $> .16$). More critical to our primary concerns, the predicted interaction between thought valence and thought confidence was significant, $\beta = .85$, $t(47) = 3.75$, $p = .001$. When we used a median split on the thought confidence index for illustrative purposes, the interaction indicated that the relationship between valence of thoughts and attitudes was significant for participants who were high in thought confidence, $\beta = .80$, $t(27) = 6.75$, $p < .001$, but not for participants who were low in thought confidence, $\beta = .24$, $t(27) = 1.26$, $p = .22$. That is, valenced thoughts predicted attitudes better when confidence was high rather than low. If we view the interaction differently, it also shows that when consequences were mostly negative (i.e., when participants generated more negative than positive consequences), attitudes became more negative as thought confidence increased, $\beta = -.50$, $t(25) = -2.89$, $p < .002$, but when consequences were mostly positive, the relationship was not significant, $\beta = .02$, $t(18) = 0.07$, $p > .90$. Thirteen participants had balanced positive and negative thoughts (i.e., positive thoughts were equal to negative thoughts) and were not included in this analysis. The lack of effect for confidence for those who generated positive thoughts was not unexpected, as only

[2] We also conducted these analyses using multilevel modeling (Kreft & de Leeuw, 1998) and found that the results did not differ from those presented here.

a small minority of participants (33%) generated mostly positive thoughts, probably because the topic was counterattitudinal in nature. Had a larger sample of individuals generated mostly positive thoughts, a significant positive relationship between attitudes and thought confidence would be expected. This issue is examined explicitly in subsequent studies. It is important to note that there were no interactions between valence of thoughts and either thought likelihood, $\beta = -.14$, $t(47) = -0.76$, $p = .45$, or thought desirability, $\beta = -.28$, $t(47) = -1.59$, $p = .12$, indicating that these variables do not account for the effects of thought confidence.

It is interesting that we also found that the interaction between thought confidence and desirability was significant, $\beta = -.40$, $t(47) = -2.60$, $p < .05$. When we used a median split on the desirability index, this interaction indicated that when low desirability consequences had been listed, the relationship between thought confidence and attitudes was marginally negative, $\beta = -.34$, $t(27) = -1.82$, $p = .08$. Low desirability consequences presumably reflect negative thoughts about the issue, so this effect may simply indicate that when thoughts are negative, greater thought confidence produces less favorable attitudes. When high desirability consequences were listed, the relationship between thought confidence and attitudes did not approach significance, $\beta = .11$, $t(27) = 0.54$, $p = .59$. None of the other two-way interactions was significant (ps $> .12$).

Regarding higher order interactions, we found one significant effect: a three-way interaction between thought valence, confidence, and desirability, $\beta = -.61$, $t(44) = -2.56$, $p < .05$. To break this effect down, we used the median split on the desirability index and found that the three-way interaction stemmed from the fact that the Thought Valence × Thought Confidence interaction described previously tended to be more apparent in the low desirability conditions, $\beta = 1.03$, $t(25) = 1.83$, $p = .08$, than in the high desirability conditions, $\beta = .26$, $t(25) = 1.33$, $p < .20$. Finally, the four-way interaction between all the predictors was not significant, $\beta = -.19$, $t(43) = -0.77$, $p = .44$.[3]

Discussion

The results of Study 1 are consistent with the self-validation hypothesis in showing for the first time that the extent to which people have confidence in the validity of their cognitive responses can play an important role in attitude change. Participants who had greater confidence in their thoughts reported attitudes that were more evaluatively congruent with those thoughts than did participants who had relatively less confidence in their thoughts. In other words, to the extent that thought confidence was relatively high, persuasion depended on the valence of thoughts. On the other hand, to the extent that thought confidence was relatively low, individuals showed less overall reliance on their thoughts in forming their attitudes. Thus, Study 1 shows that the amount of confidence people have in the validity of the cognitive responses can moderate the ability of cognitive responses to predict attitudes. Furthermore, although we found that thought confidence was reliably correlated with thought likelihood and desirability, these constructs did not account for the role that thought confidence had in moderating the relationship between thought valence and attitudes.

Study 2

The self-validation hypothesis suggests that confidence in one's thoughts can increase or decrease persuasion depending on the nature of the thoughts people generate. When cognitive responses are mostly unfavorable, increased confidence in those thoughts is expected to reduce persuasion. However, when cognitive responses are mostly favorable, increased confidence is expected to enhance persuasion. To examine this prediction explicitly, we introduced several changes in Study 2. First, the direction of the cognitive responses was directly manipulated. In Study 2, rather than asking participants to list all the thoughts they had while reading a message, we asked them to generate and to write down only arguments in favor of the message or only arguments against it. Previous research has shown that participants are able to comply with these instructions and that this is an effective way to create relatively positive or negative attitudes toward an issue (see Killeya & Johnson, 1998). Second, because measuring thought confidence before attitudes (as in Study 1) could increase its accessibility, we measured thought confidence after the attitude reports in Study 2. This change was intended to demonstrate that it does not matter when thought confidence is measured. In Study 2, we expected to find that increased thought confidence accentuates the effect of individuals' thoughts on their attitudes. When thoughts are favorable, increased confidence should enhance persuasion, but when thoughts are unfavorable, increased confidence should reduce persuasion.

In Study 2 we also included measures of attitude confidence. The purpose of these measures was twofold. First, we wanted to examine the extent to which thought confidence might affect overall confidence in one's attitude. We reasoned not only that attitudes based on highly confident thoughts should be more evaluatively congruent with those thoughts than should attitudes based on thoughts held with low confidence but that the resulting attitudes should also be held with greater confidence. The other reason we included measures of attitude confidence was to address the separability of the thought confidence construct from attitude confidence, which has already received considerable attention in the attitudes literature (see Gross et al., 1995, for a review). Thought confidence and attitude confidence are conceptually distinct concepts, but it is important to show that they are empirically distinct as well. Thus, we aimed to show that the role of thought confidence in determining attitudes would remain even when we controlled for attitude confidence.

Method

Participants and Procedure

One hundred seven undergraduates at Ohio State University participated in partial fulfillment of an introductory psychology course requirement. Participants were randomly assigned to experimental conditions.

In groups of up to 10, participants were seated in front of computers partitioned such that visual contact between them was not possible. As in

[3] We also conducted regressions including likelihood without desirability and desirability without likelihood. These results parallel the full analyses. That is, in each analysis, the Thought Confidence × Thought Valence interaction still predicted attitudes and was not accounted for by either likelihood or desirability.

Study 1, all materials were presented on computers using MediaLab 2000 (Jarvis, 2000). Participants were told that Ohio State University was considering the possibility of instituting senior comprehensive exams in students' major areas and that the university's board of trustees wanted to gauge students' reactions. Again, this topic was chosen because its high personal relevance for all participants was likely to increase their extent of thinking. Moreover, participants were explicitly encouraged to think carefully about the information. All participants received a message in favor of the comprehensive exams, containing two strong and two weak arguments, and were assigned to generate thoughts that were either in favor of or against the message. Then, using the same procedure as in Study 1, participants used the computer keyboard to enter pro- or counterarguments into a series of boxes that appeared on the computer screen. These boxes were presented on the screen one at a time. Participants were allowed to enter a maximum of 10 thoughts. Following this procedure, attitudes toward the proposal and attitude confidence were measured. Finally, participants were asked to return to the thoughts they listed about the senior comprehensive exam topic and answer questions pertaining to the confidence they had in each one.

Independent Variables

Direction of thoughts. Before reading the comprehensive exam proposal, participants were instructed that they would be asked to list either arguments in favor of the message or arguments against the message after reading it. In the proargument condition, participants were told to list as many positive thoughts in favor of the exam proposal as possible, whereas in the counterargument condition, they were told to list as many negative thoughts against the proposal as possible. Instructions were adapted from those used by Killeya and Johnson (1998). Examination of the thoughts listed indicated that all participants followed the instructions and wrote either all favorable or all unfavorable thoughts.

Thought confidence. After the participants read the message, listed their thoughts, and responded to measures of attitudes and attitude confidence, the computer presented each of the thoughts entered back to the participants, and they were asked to rate the amount of confidence they had in the validity of each one. Specifically, they rated each thought on a 9-point scale anchored at *not at all confident* (1) and *extremely confident* (9). These ratings were highly consistent with each other ($\alpha = .84$) and were averaged to form a single index of overall thought confidence for each participant ($Mdn = 6.50$).

Dependent Measures

Attitudes. Participants' attitudes toward the senior comprehensive exams were assessed using a series of 9-point (1–9) semantic differential scales (i.e., against–in favor, unfavorable–favorable, bad–good, foolish–wise, negative–positive, beneficial–harmful) on which participants rated the exam policy after reading the message. Ratings on the different scales were highly intercorrelated ($\alpha = .94$) and were thus averaged to create a composite attitude index.

Attitude confidence. Attitude confidence was measured using two 9-point scales adapted from Fazio and Zanna (1978a, 1978b). After participants reported their attitudes toward the exam policy, they were asked, "How much confidence do you have in your attitude toward senior comprehensive exams?" Response options ranged from *none at all* (1) to *very much* (9). Following this question, participants were also asked, "How certain are you of your opinion toward the exam policy?" Responses to this item were given on a scale ranging from *not at all certain* (1) to *extremely certain* (9). Because these items were highly correlated ($r = .70$), they were combined to form a single index.

Number of thoughts. We also analyzed the number of thoughts listed by participants. Because people might have been more or less confident depending on the number of thoughts they were able to list and because more thoughts in a particular direction would likely influence attitudes in the same direction, it was important to demonstrate that thought confidence and number of thoughts were unrelated, thus ruling out number of thoughts as an alternative explanation for our thought confidence findings.

Quality of thoughts. It is also important to note that, because the actual quality or cogency of the thoughts participants listed could influence their thought confidence ratings, we analyzed the quality of participants' positive and negative thoughts. Specifically, participants' thoughts were rated on a 4-point scale by a judge who was unaware of the experimental hypotheses. The judge rated thoughts on the extent to which they were high quality persuasive thoughts (3) or low quality unpersuasive thoughts (0) in favor of or against the exam message. To assess the reliability of this judge, we had a second judge rate the thoughts of 40 randomly selected participants. These ratings were highly correlated with those of the first judge ($r = .92$, $p < .001$). Thus, we concluded that the first judge's ratings were reliable, and we used these in the analyses.

Results

All regression analyses follow the same hierarchical format as the analyses presented in Study 1, in which we conducted a series of regressions of increasing complexity, interpreting only the highest order terms within each one.

Number and Quality of Thoughts

We added up the number of thoughts each participant generated and submitted the data to hierarchical regression analysis with thought confidence, direction of thoughts, and the interaction term as the predictors. This analysis revealed an effect for direction of thoughts, $\beta = .32$, $t(104) = 3.44$, $p = .001$, such that participants in the positive thoughts condition listed more thoughts ($M = 5.72$, $SD = 4.02$) than did participants in the negative thoughts condition ($M = 3.74$, $SD = 2.26$). More important, however, there was neither a significant main effect for thought confidence, $\beta = -.10$, $t(104) = -1.12$, $p = .27$, nor a significant interaction between thought confidence and direction of thoughts, $\beta = -.13$, $t(103) = -1.08$, $p = .28$.

The thought quality ratings were submitted to the same analysis. This analysis revealed an effect for the direction of thoughts, $\beta = .33$, $t(104) = 3.41$, $p = .001$, such that the positive thoughts were higher in quality overall than were the negative thoughts. Consistent with our expectations, however, there was no relationship between thought confidence and the rated quality of the thoughts listed, $\beta = .15$, $t(104) = 1.56$, $p = .12$, nor was there an interaction between thought confidence and direction of thoughts, $\beta = -.18$, $t(103) = -1.43$, $p = .16$. Thus, as expected, confidence was not related to either the number or the quality of thoughts participants listed.

Attitudes

Responses to the attitude scales were scored such that higher values represented more favorable attitudes toward the proposal. These data were submitted to a hierarchical regression analysis with measured thought confidence and manipulated direction of thoughts (dummy coded) as the independent variables. This analysis followed the same format as in Study 1. Again, variables were standardized prior to analysis. Two significant effects emerged from this analysis. First, and not surprising, there was a main effect for the direction of the thoughts, $\beta = .43$, $t(104) = 4.74$, $p < .001$,

such that participants who were instructed to generate thoughts in favor of the exams held more favorable attitudes toward the proposal ($M = 6.33$, $SD = 1.63$) than did those instructed to generate thoughts against the proposal ($M = 4.59$, $SD = 2.17$). There was no main effect for thought confidence, $\beta = -.02$, $t(104) = -0.24$, $p = .81$.

More interesting and germane to the present concerns, an interaction emerged between direction of thoughts and thought confidence, $\beta = .58$, $t(103) = 5.55$, $p < .001$. This interaction conceptually replicates that found in Study 1. In this case, we divided participants according to their assignment to the positive thoughts or negative thoughts group. As illustrated in Figure 1, individuals who had generated positive thoughts showed a positive relationship between thought confidence and attitudes—the more confidence they had in their thoughts, the more favorable were their attitudes, $\beta = .62$, $t(47) = 5.36$, $p < .001$. In contrast, individuals who had generated negative thoughts showed an inverse relationship between thought confidence and attitudes. Here, the more confidence they had in their thoughts, the less favorable were their attitudes, $\beta = -.40$, $t(56) = -3.27$, $p = .002$.

Attitude Confidence

Responses to the attitude confidence scales were scored such that higher numbers reflected more confidence in the attitudes reported. These data were submitted to a hierarchical regression with the same variables as in the previous analysis. As expected, this analysis revealed an effect for thought confidence, $\beta = .49$, $t(104) = 5.67$, $p < .001$, such that participants reported feeling more confident and certain about their attitudes to the extent that they were high in thought confidence. Direction of thoughts did not have a significant effect on attitude strength, $\beta = -.05$, $t(104) = -0.54$, $p = .59$. It is interesting that there was an interaction between thought confidence and direction of thoughts on the attitude confidence measure, $\beta = .23$, $t(103) = 2.09$, $p < .04$. This interaction suggests that the relationship between thought confidence and attitude confidence was slightly greater for participants who generated positive thoughts, $\beta = .61$, $t(47) = 5.30$, $p < .001$, than for those who generated negative thoughts, $\beta = .37$, $t(56) = 3.02$, $p < .01$, though both groups evinced the predicted positive relationship.

Another important goal of the present study was to demonstrate that the impact of thought confidence on attitudes was independent of any variance this construct shared with attitude confidence. Indeed, our measures of thought confidence and attitude confidence were significantly correlated in this study, as expected if attitude confidence is based at least in part on thought confidence ($r = .40$, $p < .001$). We reconducted our primary analysis of the attitude data, this time directly controlling for attitude confidence as a predictor in the regression analysis. Specifically, we conducted a hierarchical regression analysis, predicting attitudes, with thought confidence, attitude confidence, direction of thoughts, and all of their interactions as predictors. Redundancy would be indicated if including the interaction between attitude confidence and direction of thoughts eliminated the significant interaction between thought confidence and direction of thoughts. As in the previous analysis of the attitude data, there was a significant effect for direction of thoughts, $\beta = .43$, $t(103) = 4.88$, $p < .001$, suggesting that attitudes were more favorable after participants generated positive thoughts as opposed to negative thoughts. Neither of the other main effects was significant, although attitude confidence was marginally correlated with attitudes in a positive direction, $\beta = .18$, $t(103) = 1.76$, $p = .08$. More important, the interaction

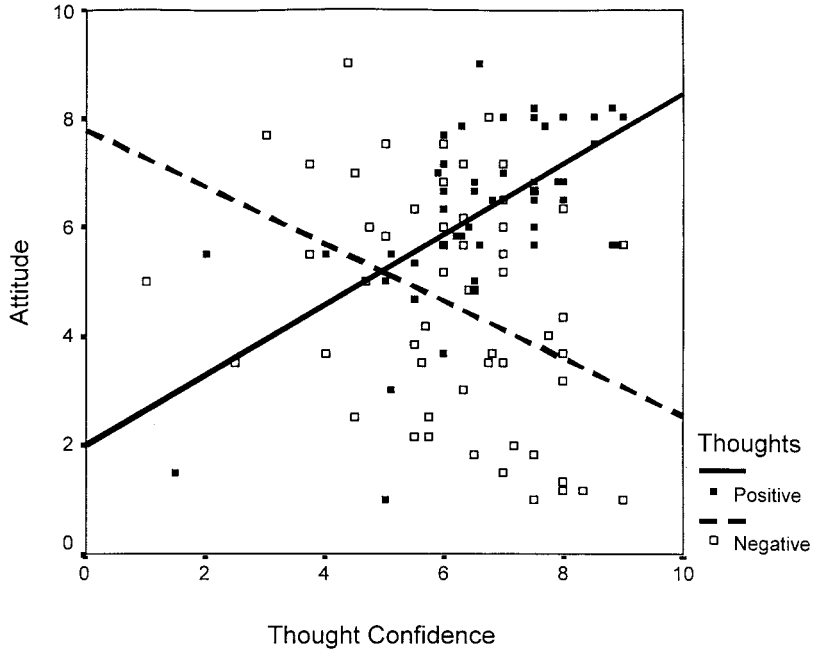

Figure 1. Interaction between thought confidence and direction of thoughts (Study 2). Figure contains raw scores on relevant measures.

between thought confidence and direction of thoughts remained significant in this analysis, $\beta = .33$, $t(100) = 2.98$, $p = .004$. The significance of the predicted interaction in this analysis indicates that the thought confidence findings cannot be attributed to redundancy with attitude confidence.

Though not relevant to our primary concerns, the interaction between attitude confidence and direction of thoughts was also significant, $\beta = 1.07$, $t(100) = 4.06$, $p < .001$, and suggests that when participants generated positive thoughts, attitudes and attitude confidence were positively correlated, $\beta = .76$, $t(47) = 8.05$, $p < .001$, whereas when participants generated negative thoughts, these variables were negatively related, $\beta = -.34$, $t(56) = -2.78$, $p < .01$. That is, when participants were told to generate favorable thoughts, the more favorable their attitudes were, the more confidence they had in them, but when they were told to generate unfavorable thoughts, the more unfavorable their attitudes were, the more confidence they had in them.

Finally, an unanticipated two-way interaction between attitude confidence and thought confidence was also significant, $\beta = -1.15$, $t(100) = -3.49$, $p = .001$. This interaction indicated that when thought confidence was low, attitudes and attitude confidence were positively correlated, $\beta = .45$, $t(49) = 3.48$, $p = .001$, but when thought confidence was high, there was no relationship between these variables, $\beta = -.03$, $t(54) = -0.20$, $p = .84$. The three-way interaction was not significant, $\beta = 1.01$, $t(99) = 1.16$, $p = .25$.

Discussion

The results of Study 2 are consistent with the self-validation hypothesis, showing that confidence in one's thoughts can increase or decrease persuasion depending on the nature of the thoughts generated. As expected, participants who wrote negative thoughts reported less favorable attitudes toward the proposal as confidence in their negative thoughts increased, replicating the findings from Study 1. In addition, we found for the first time that when participants generated mostly favorable thoughts, increased thought confidence was associated with more persuasion.

Together, the first two studies demonstrate that the self-validation effect does not depend on when confidence is assessed (i.e., before or after attitudinal judgments). Because measuring thought confidence before attitudes could increase its accessibility and make it more likely to be used in attitudinal judgments, in Study 2 we measured thought confidence after the attitude report. As noted, the effect of thought confidence on attitudes was similar in both studies.

Furthermore, in Study 2 we demonstrated that thought confidence has implications for attitude strength. That is, individuals with a relatively high level of confidence in their thoughts about something also reported feeling more confident or certain about their attitudes toward it. In addition, we demonstrated that attitude confidence could not account for any of the effects associated with thought confidence. Because prior research has shown that attitude confidence, as an indicator of attitude strength, is associated with reduced persuasion (Babad et al., 1987; Krosnick, Boninger, Chuang, Berent, & Carnot, 1993), it is notable that Study 2 shows that thought confidence can be associated with either increased or decreased persuasion.

Nevertheless, because confidence in participants' thoughts was measured rather than manipulated in both Study 1 and Study 2, some questions could be raised concerning the interpretation of the results. Although we found no differences in the number or quality of the thoughts generated across levels of thought confidence, it remains a possibility that our measures of these constructs were ineffective. It is also possible that there were some unmeasured confounds with confidence of which we were unaware. Of course, for practical purposes, it is very informative to know that measuring thought confidence can lead to increased predictability in attitudes. But, for conceptual purposes, it is important to manipulate thought confidence to isolate the causal effects of this variable. This was accomplished in Studies 3 and 4.

Study 3

Study 3 was designed to provide a conceptual replication and extension of the findings from the first two studies. To this end, several changes were introduced. First, in Study 3 we returned to the naturalistic procedure used in Study 1, in which participants were simply asked to write down whatever thoughts they had while reading the message. However, to ensure that participants generated mostly positive or negative thoughts, we manipulated the cogency of the arguments in the persuasive message (Petty et al., 1976). Second and most important, we developed and used an experimental procedure to directly manipulate the extent to which participants had confidence in the validity of their cognitive responses.

Finally, the self-validation hypothesis predicts that the effects of confidence in one's thoughts should be most apparent when the likelihood of thinking is high. As noted earlier, there are at least two reasons for this. First, if people have few thoughts during the message, then there will be few thoughts to validate or invalidate, and any effects will thereby be attenuated. Second, the same factors that would likely motivate high amounts of scrutiny and elaboration of a message (e.g., high personal importance of the topic, accountability; see Petty & Cacioppo, 1986) would also likely motivate people to scrutinize and evaluate the validity of their thoughts. Because participants in the first two studies were explicitly asked to think carefully about the message and because the topic was personally relevant for them, we assumed that the likelihood of thinking was high. It would be informative, however, to compare the reactions of individuals who were engaged in relatively more versus less thinking about the message. Thus, in Experiment 3 we included measures of the extent to which participants attended to and elaborated on the information contained in the message. Self-validation effects were expected to be greatest for those engaged in a higher level of elaboration.

In line with the self-validation hypothesis, we expected to find that confidence in one's own thoughts would have opposite effects on persuasion depending on the dominant response elicited by the message. That is, the self-validation hypothesis predicts that confidence will interact with argument quality to influence persuasion. More specifically, participants exposed to the strong version of the message (thus generating predominately favorable thoughts) were expected to show greater attitude change with high than with low confidence. On the other hand, participants who were exposed to the weak version of the message (thus generating predominately unfavorable thoughts) were expected to show less attitude change

with high than with low confidence. Viewed differently, the interaction would also show that the effect of argument quality on attitudes should be greater when people have high rather than low confidence in their cognitive responses to these arguments. These effects should be particularly evident under high elaboration conditions. Furthermore, with relatively high confidence, people should view their positive and negative thoughts as valid and rely on them in forming attitudes (producing a high attitude–thought correspondence), but with relatively low confidence, people should view their positive and negative thoughts as less valid and rely on them less in forming attitudes (producing a low attitude–thought correspondence).

Method

Participants and Design

Eighty-two undergraduates at Ohio State University participated in partial fulfillment of an introductory psychology course requirement. They were randomly assigned to thought confidence conditions (confidence or doubt) and message quality conditions (strong or weak) and reported their own level of elaboration on a continuous measure.

Procedure

When participants came to the session, they were seated in a room with 10 partitioned work stations. In each station was a questionnaire packet and pencil for participants to use in the experiment. Basic introductory instructions were given out loud by the experimenter, after which all instructions were contained in the packet itself. Participants were told that they were going to participate in two different research projects. The first study was described as a part of an investigation into possible changes in Ohio State University academic policies. As in Studies 1 and 2, all participants were told that Ohio State University was considering the possibility of instituting senior comprehensive exams in students' major areas and that the university's board of trustees wanted to gauge students' reactions. Unlike Studies 1 and 2, participants were not given special instructions to pay close attention or to think carefully. Participants received a strong or weak version of the message in favor of the comprehensive exams and were asked to list their thoughts in response to the message.

After the thought listing task, participants were told that because there was extra time remaining in the session, they would also be participating in another study about prototypical reactions to certain types of situations. As a part of this second research project, the manipulation of confidence (described shortly) was introduced. Following the confidence manipulation, participants were asked to think back to the thoughts they listed about the senior comprehensive exam topic and, as a control and memory measure, answer several questions about the confidence they had in their thoughts. Next, participants were told that because their personal views on the senior comprehensive exam topic might have influenced their responses to the earlier questions, we wanted to know what their opinions were on the issue. Finally, participants were asked to report the extent of their thinking about the proposal.

Independent Variables

Argument quality. Participants received a message advocating the implementation of a new comprehensive exam policy at their university. The message they received contained adaptations of either the strong or the weak arguments on this topic developed by Petty and Cacioppo (1986). This manipulation was designed to influence the valence of participants' cognitive responses. Examples of strong arguments in favor of the exam policy include that students' grades would improve if the exams were adopted and that the average starting salary of graduates would increase. Examples of weak arguments, on the other hand, include that implementing the exams would allow the university to take part in a national trend and that the exams would give students the opportunity to compare their scores with those of students at other universities.

Confidence in thoughts. In what was ostensibly a second study, participants were randomly assigned to receive instructions to recall and describe personal experiences when they felt either confidence or doubt in what they were thinking. They were provided with five blank boxes in which to describe these experiences during a 5-min period. Some examples of thoughts participants listed in the confidence condition included, "In math class I solved a difficult problem and explained it to my group," and, "When I worked at a movie theater for half a year and got promoted." Some examples of thoughts listed in the doubt condition included, "When I haven't really studied and I tend to make up something," and, "When I was in a fight and I was bleeding and it wouldn't stop."[4]

Extent of elaboration. To assess extent of elaboration, we asked participants to rate the extent to which they had thought about the exam proposal. Elaboration was rated on two 7-point semantic differential scales, the first anchored with *low thinking* (1) and *high thinking* (7) and the second anchored with *low attention paid* (1) and *high attention paid* (7). The two measures were highly correlated ($r = .75$, $p < .01$) and were averaged to form one measure of elaboration.

Dependent Measures

Thought index. Following the message, participants were instructed to list the thoughts that went through their minds as they read the message. Twenty boxes were provided for their individual thoughts. They were told to write one thought per box and not to worry about grammar or spelling (see Cacioppo & Petty, 1981). Thoughts were classified as positive, negative, or neutral in content and as message relevant or irrelevant by a judge who was unaware of the experimental conditions. As an index of valence of message-related thoughts, we subtracted the number of unfavorable message-related thoughts from the number of favorable message-related thoughts and divided the difference by the total number of message-related thoughts. To ensure the reliability of the judge's codings, we had a second judge, also unaware of the experimental conditions, code the thoughts of 25 randomly selected participants. The primary and secondary judges' ratings were highly correlated ($r = .90$, $p < .001$). Thus, the primary judge's codings were deemed reliable and were used in the analyses.

Confidence in thoughts. After the confidence induction task and before we measured attitudes toward the proposal, participants were asked to think back to the thoughts they listed about the comprehensive exam policy and to rate their overall confidence in the thoughts they had listed. Thought confidence was rated on four 7-point semantic differential scales anchored at *not at all* (1) and *extremely* (7), including "confident," "certain," "valid," and "convincing." Responses to these items were highly intercorrelated ($\alpha = .73$) and were thus averaged to create a composite measure of confidence in thoughts.

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[4] Rather than use a hypnosis procedure that has proven effective in manipulating thought confidence in prior research (see Clore & Parrott, 1994), we adapted a procedure used commonly to vary mood. Previous research has shown that asking people to think about and write down emotional experiences can affect their current mood states (for a review, see Gerrards-Hesse, Spies, & Hesse, 1994), and these mood states can be misattributed to various objects or events in the environment (e.g., "I feel good, so I must like the message"; see Schwarz & Clore, 1996, for a review). Similarly, we expected that thinking and writing about confidence experiences would affect the extent to which participants had confidence in the validity of their current thoughts by a misattribution mechanism (see Tiedens & Linton, 2001).

Attitudes. Participants were informed that it was important to assess their attitudes toward the issue, as opinions about the issue might have influenced their responses to other items. Participants' attitudes toward the exams were assessed using a series of 5-point (1–5) semantic differential scales (agree–disagree, bad–good, foolish–wise, negative–positive, beneficial–harmful). Ratings on the different scales were highly intercorrelated ($\alpha = .90$) and were thus averaged to create a composite attitude measure.

Results

All dependent measures were submitted to a hierarchical regression analysis with argument quality (dummy coded), manipulated thought confidence (dummy coded), and the continuous elaboration measure as the predictors. Main effects and interaction terms were interpreted in the same fashion as in the first two studies.

Manipulation Checks

Thought valence and number. As expected, analysis of the thought index yielded an effect for argument quality, $\beta = .37$, $t(78) = 3.44$, $p = .001$. The positive relationship indicated that participants' thoughts were more favorable toward the advocacy after receiving strong arguments ($M = 0.13$, $SD = 0.80$) rather than weak arguments ($M = -0.36$, $SD = 0.66$). No other effects were significant ($ps > .15$).

We also analyzed the number of thoughts participants listed. There was a significant effect for argument quality on number of thoughts, $\beta = -.38$, $t(78) = -3.65$, $p < .001$, indicating that participants generated more thoughts in response to weak arguments ($M = 5.47$, $SD = 2.53$) than they did in response to strong arguments ($M = 3.52$, $SD = 2.35$). No other effects were significant ($ps > .33$).

Confidence in thoughts manipulation check. Analysis of the thought confidence data revealed a main effect for the thought confidence manipulation, $\beta = .49$, $t(78) = 4.96$, $p < .001$, such that participants in the confidence condition reported more confidence in their own thoughts ($M = 6.00$, $SD = 0.79$) than did participants in the doubt condition ($M = 4.89$, $SD = 1.14$). All other effects were nonsignificant ($ps > .15$).

Attitudes

Responses to the attitude scales were scored such that higher values represented more favorable opinions of the proposal. The regression analysis revealed two significant effects. First, there was a main effect for the argument quality manipulation, $\beta = .32$, $t(78) = 3.01$, $p = .003$, suggesting that, overall, attitudes were more favorable when participants had been exposed to strong ($M = 6.38$, $SD = 2.34$) than to weak arguments ($M = 5.12$, $SD = 2.31$). No other main effects were significant ($ps > .31$). Moreover, none of the two-way interactions were significant ($ps > .18$).

As predicted, however, the argument quality main effect was qualified by a three-way interaction between argument quality, thought confidence, and extent of elaboration, $\beta = .43$, $t(74) = 2.10$, $p < .04$. To elucidate the nature of this effect, we classified participants as either high or low in self-reported elaboration, as determined by a tertiary split on the elaboration index, and analyzed each elaboration group separately after obtaining a significant three-way interaction in a $2 \times 2 \times 2$ analysis of variance, $F(1, 59) = 4.60$, $p < .04$ (i.e., Low or High Elaboration $\times$ Strong or Weak Arguments $\times$ High or Low Thought Confidence).[5] In the separate 2×2 analyses of variance on the high and low thought confidence groups, we found that self-validation effects were confined to high elaboration conditions. That is, under high elaboration conditions, there was a main effect for argument quality, $F(1, 59) = 20.08$, $p < .001$, qualified by a two-way interaction between argument quality and thought confidence, $F(1, 59) = 33.03$, $p < .001$. As illustrated in the top panel of Figure 2, for high elaboration participants, the effect of argument quality on attitudes was present when participants had confidence in their thoughts, $F(1, 59) = 43.94$, $p < .001$, but not when they had doubt about their thoughts, $F(1, 59) = 1.12$, *ns.* Viewed differently, when high elaboration participants had been exposed to a strong message that elicited mostly favorable thoughts, their attitudes were more favorable when they had confidence in their thoughts than when they had doubt in their thoughts, $F(1, 59) = 6.00$, $p < .02$. When these participants had been exposed to a weak message, however, and their thoughts were mostly unfavorable, the effect was reversed. That is, their attitudes were more favorable when they had doubt in their thoughts than when they had confidence in them, $F(1, 59) = 34.63$, $p < .001$. This pattern provides a conceptual replication of Study 2. Under low elaboration conditions, as illustrated in the bottom panel of Figure 2, there were no significant effects ($ps > .24$).

Discussion

According to the self-validation hypothesis, confidence in thoughts should matter most when motivation and ability to think are at a relatively high level. In the first two studies, we attempted to test the role of confidence in thoughts by encouraging all participants to think extensively. In addition to describing a personally relevant topic (Petty & Cacioppo, 1979), we explicitly instructed all participants to pay close attention and think carefully about the material. In the third study, we sought to test the moderating role of elaboration and, to this end, desired more variability in participants' levels of thought. Thus, we removed explicit instructions to pay attention and to think carefully about the material and also included a measure of self-reported elaboration. As predicted, the self-validation effects were restricted to conditions in which participants reported a relatively high level of elaboration. Under low elaboration conditions, there were no significant effects.

Of most importance, however, in Study 3 we provided the first experimental manipulation of thought confidence in a persuasion setting. The self-validation pattern was still obtained under high elaboration conditions. This rules out the possibility that there were unmeasured differences in the quality or cogency of the thoughts listed by high and low confidence individuals that were responsible for the effects observed in the prior studies. Rather, it appears that confidence causes people to be more reliant on their thoughts when expressing their attitudes.

[5] We also performed a median split on the self-reported elaboration scores. Although the pattern of data resembled that obtained from the tertiary split, the crucial effects did not reach conventional levels of significance.

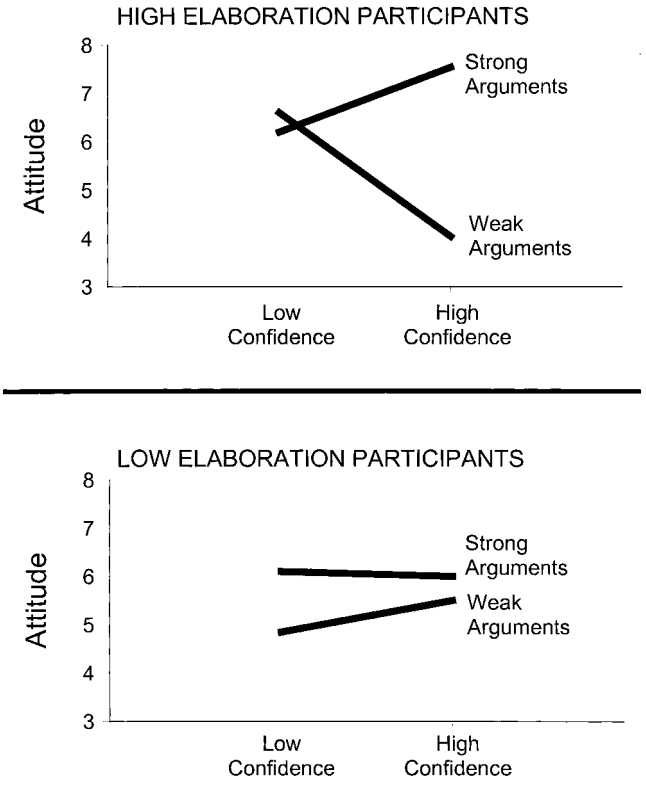

Figure 2. The two-way interaction between argument quality and the thought confidence manipulation for high elaboration participants (top panel) and low elaboration participants (bottom panel).

It is interesting that considerable previous work in persuasion has shown that argument quality effects tend to be greater under high elaboration conditions than under low elaboration conditions (see Eagly & Chaiken, 1993; Petty & Cacioppo, 1986, for reviews). That is, when motivation and ability to process information are relatively high, greater attitude change has been found when persuasive messages contain strong rather than weak arguments. However, the results of our research show that this is not invariably the case. When high elaboration individuals were induced to doubt the validity of their cognitive responses, the argument quality effect on attitudes disappeared (see Figure 2, top panel). Thus, confidence in thoughts appears to be an important dimension of thinking that can enhance or inhibit argument quality effects and moderate the relationship between attitudes and issue-relevant thoughts. In short, the present research suggests that to better understand persuasion, in addition to the content and the extent of the thinking, researchers should also focus on people's evaluation of or confidence in their thoughts.

Study 4

Study 4 was designed to replicate and extend the findings from Study 3. Specifically, we sought to replicate the findings using a different manipulation of thought confidence and a different operationalization of elaboration. As anticipated by Festinger's (1950) notion of *consensual validation*, previous research has demonstrated that people become more confident in their beliefs following validation of those beliefs by others (e.g., Goethals & Nelson, 1973; Orive, 1988a, 1988b). In a recent review of this literature, Sechrist and Stangor (2001) discussed unpublished data from their lab in which they asked participants about their beliefs toward African Americans and then provided them with either high or low consensus information (i.e., they told participants their in-group either agreed or disagreed with them). After a short period of time, participants were asked to report their beliefs again and also the confidence with which they held those beliefs. Sechrist and Stangor found that following high and low consensus information, participants' confidence in their beliefs increased and decreased, respectively. In the present study, we used an adaptation of this paradigm to manipulate participants' confidence in their thoughts about a persuasive message. Specifically, after listing their thoughts, participants in Study 4 were told that their thoughts had been compared with a representative sample of thoughts from other Ohio State University students and that their thoughts were either highly similar (high confidence) or highly dissimilar (low confidence) to this pool, causing them to be accepted or rejected for future research, respectively.

Equally important, we changed the operationalization of elaboration in this study. Instead of measuring the extent to which participants attended to and elaborated on the information contained in the specific message presented, we had participants in Study 4 complete the Need for Cognition Scale (Cacioppo, Petty, & Kao, 1984). The need for cognition (Cacioppo & Petty, 1982) refers to stable individual differences in the tendency to engage in and enjoy effortful thought. Individuals who are high in the need for cognition consistently have been found to engage in greater elaboration of persuasive messages than do those who are low in the need for cognition and to favor a wide variety of other cognitive tasks (see Cacioppo, Petty, Feinstein, & Jarvis, 1996, for a review). As explained previously, the self-validation hypothesis predicts that thought confidence will interact with argument quality to influence persuasion, especially when conditions favor thinking. Specifically, high confidence in one's thoughts is expected to increase persuasion when thoughts are mostly favorable (i.e., when strong arguments are presented) and to decrease persuasion when thoughts are mostly unfavorable (i.e., when weak arguments are presented). These effects were expected to be particularly evident for high need for cognition participants.

Method

Participants and Design

Seventy-six undergraduates at Ohio State University participated in partial fulfillment of an introductory psychology course requirement. They were randomly assigned to experimental conditions in a 2 (confidence in thoughts: high or low) $\times$ 2 (message quality: strong or weak) between-subjects factorial design. Need for cognition was also assessed.

Procedure

The introduction to this study was very similar to the first three studies. As with Studies 1 and 2, all materials were presented on a computer using MediaLab 2000 (Jarvis, 2000). Participants were told that Ohio State University was considering the possibility of instituting senior comprehensive exams in students' major areas and that the university's board of trustees wanted to assess student reactions. Participants received a strong or

weak version of the message in favor of the comprehensive exams and were asked to list their thoughts in response to the message. Participants entered their thoughts using the computer keyboard. Participants were then given artificial feedback about their thoughts designed to increase or decrease the confidence they had in them. After receiving this information, participants were asked to think back to the thoughts they listed about the senior comprehensive exam topic and answer several questions about the confidence they had in those thoughts. Finally, participants reported their attitudes and then completed the Need for Cognition Scale.

Independent Variables

Argument quality. This manipulation was identical to that used in Study 3.

Confidence in thoughts. After participants entered their thoughts about the message, they were told that the thoughts they listed were going to be analyzed by the computer and compared with a pool of thoughts of 1,800 other students from Ohio State University. After 10 s, a new computer screen appeared with the ostensible outcome of this comparison. Half of the participants were told that their thoughts had been rejected for future research because they were very different from the rest of the members of their group (i.e., only 8% of their thoughts were similar to those of other Ohio State University students). The other half of the participants were told that their thoughts had been accepted into the pool for future research because they were quite similar to the thoughts listed by other members of their group (i.e., 87% of their thoughts were similar to those of other Ohio State University students).

Need for cognition. Participants completed the 18-item version of the Need for Cognition Scale (Cacioppo et al., 1984). This scale contains statements such as "I prefer complex to simple problems" and "Thinking is not my idea of fun." Participants respond to each statement on a 5-point scale anchored at (1) *extremely uncharacteristic of me* and (5) *extremely characteristic of me.* The items on this scale were highly intercorrelated ($\alpha = .89$), so responses to each item were summed to form a composite score. Scores ranged from 27 to 87, and the median score was 57. Analyses revealed that need for cognition was not affected by either of the manipulations or their interaction (Fs < 1).

Dependent Measures

Thought index. Following the message, participants were instructed to list the thoughts that went through their mind as they read the message. Ten boxes were provided for their individual thoughts, which were entered into the computer in the same fashion as in Studies 1 and 2. They were told to write one thought per box and not to worry about grammar or spelling (Cacioppo & Petty, 1981).

Attitudes. Participants were informed that it was important to assess their attitudes toward the issue, as their attitudes might have influenced their other responses. We assessed participants' attitudes toward the exams using a series of 9-point (1–9) semantic differential scales (agree–disagree, bad–good, foolish–wise, negative–positive, beneficial–harmful). Ratings on the different scales were highly intercorrelated ($\alpha = .86$) and were averaged to create a composite attitude measure.

Confidence measures. Participants were also asked to think back to the thoughts they listed in response to the message. First, to obtain a direct check on the confidence manipulation, we asked participants to rate the extent to which they considered their thoughts to be similar to or different from other people's thoughts. Ratings were made on a 9-point scale anchored at *not at all similar* (1) and *extremely similar* (9). Second, to assess overall confidence in thoughts, we had participants rate their thoughts with respect to the following items: "confident," "certain," "valid," and "convincing." Ratings were made on four 9-point semantic differential scales anchored at *not at all* (1) and *extremely* (9). These four items were highly intercorrelated ($\alpha = .77$) and were averaged to form one overall confidence index.

Results

We first submitted all dependent measures to a hierarchical regression analysis, treating need for cognition as a continuous variable and dummy coding manipulated variables, and subsequently to a 2 (thought confidence: high or low) $\times$ 2 (argument quality: strong or weak) $\times$ 2 (need for cognition: high or low) between-subjects analysis of variance, where need for cognition was dichotomized on the basis of a median split, to decompose interaction effects obtained in the regression analyses.

Manipulation Checks

Thoughts. Cognitive responses were coded by two judges unaware of participants' experimental conditions. Thoughts were classified as positive, negative, or neutral in content and as message relevant or irrelevant by a judge unaware of the participants' experimental conditions. We formed an index of issue-relevant thoughts (i.e., all thoughts listed that relate to the topic of the advocacy) to assess the extent of message processing. Regression analyses indicated that there was a significant effect for need for cognition, $\beta = .26$, $t(72) = 2.29$, $p < .03$, but not for any other variables or their interactions (ps $> .21$). As need for cognition increased, more relevant thoughts were listed.

An index of favorability of message-related thoughts was also formed in the same manner as previously. That is, we subtracted the number of unfavorable message-related thoughts from the number of favorable message-related thoughts and divided the difference by the total number of message-related thoughts. To ensure the reliability of the primary judge's codings, we had a second judge, unaware of experimental conditions, code the thoughts of 25 randomly selected participants. The primary and secondary judges' ratings were highly correlated ($r = .92$, $p < .001$). Thus, the ratings from the primary judge were deemed reliable and used in the analyses. Submitting this index to a hierarchical regression analysis revealed two significant effects. First, there was a main effect for argument quality, $\beta = .31$, $t(72) = 2.82$, $p < .01$. Thoughts were more favorable when arguments were strong rather than weak. There was also a significant interaction between argument quality and need for cognition, $\beta = .33$, $t(69) = 2.01$, $p < .05$. Splitting need for cognition at the median to understand the interaction revealed that, consistent with much prior work on need for cognition (see Cacioppo et al., 1996), the argument quality effect was restricted to individuals high in need for cognition, $F(1, 68) = 8.99$, $p < .01$, rather those low in need for cognition ($F < 1$). No other effects approached significance (ps $> .13$).

Manipulation check on confidence. First we analyzed the extent to which participants considered their thoughts to be similar to or different from other people's thoughts. Consistent with expectations, regression analyses indicated that there was a significant effect for the manipulation of thought confidence on this measure, $\beta = .35$, $t(72) = 3.16$, $p < .003$. Participants in the high consensus condition reported that their thoughts were more similar to others' thoughts ($M = 5.10$, $SD = 2.18$) than did participants in the low consensus condition ($M = 4.15$, $SD = 2.08$). No other effects were significant in this analysis (ps $> .12$).

It is important to note that the same analyses on the index of thought confidence also revealed a main effect for the consensus

manipulation, $\beta = .31$, $t(72) = 2.38$, $p < .03$. As expected, participants in the high consensus condition reported more confidence in their own thoughts ($M = 7.09$, $SD = 1.16$) than did participants in the low consensus condition ($M = 6.34$, $SD = 1.52$). This finding indicates that our consensus manipulation was successful in creating relatively high and low thought confidence. No additional effects were significant on this measure (Fs < 1).

Attitudes

Responses to the attitude scales were scored such that higher values represented more favorable attitudes toward the proposal. First, these scores were submitted to a hierarchical regression analysis, with thought confidence (dummy coded), argument quality (dummy coded), need for cognition (continuous), and all the interaction terms as the predictors. This analysis yielded a significant effect for argument quality, $\beta = .31$, $t(72) = 2.77$, $p = .007$, such that participants who received strong arguments reported more favorable attitudes toward the proposal ($M = 6.33$, $SD = 2.00$) than did those who received weak arguments ($M = 4.97$, $SD = 2.14$).

The only other significant effect to emerge was the three-way interaction between thought confidence, argument quality, and need for cognition, $\beta = .69$, $t(68) = 3.43$, $p = .001$. As illustrated in Figure 3, the pattern of results varied as a function of need for cognition. First, for high need for cognition participants, as determined by a median split (top panel, Figure 3), a 2 (argument quality: strong or weak) $\times$ 2 (confidence: high or low) analysis of variance evinced a main effect for argument quality such that participants who received strong arguments held more favorable attitudes toward the proposal ($M = 6.71$, $SD = 1.83$) than did those who received weak arguments ($M = 5.10$, $SD = 2.24$), $F(1, 68) = 5.29$, $p < .05$. More germane to the self-validation hypothesis, for high need for cognition participants there was also a two-way interaction between argument quality and thought confidence, $F(1, 68) = 11.70$, $p < .01$. This interaction indicated that for the strong message, people were more favorable toward the proposal when thought confidence was high ($M = 7.54$, $SD = 1.22$) than when it was low ($M = 5.40$, $SD = 1.93$), $F(1, 68) = 6.33$, $p < .02$. For the weak message, however, attitudes were more favorable when thought confidence was low ($M = 6.10$, $SD = 1.95$) than when it was high ($M = 3.97$, $SD = 2.11$), $F(1, 68) = 5.44$, $p < .03$. Viewed differently, the interaction shows that for high need for cognition individuals, argument quality influenced attitudes when thought confidence was high, $F(1, 68) = 17.57$, $p < .001$, but not when it was low ($F < 1$). For the low need for cognition participants, the same 2 $\times$ 2 analysis of variance produced no significant effects (ps $> .10$). This pattern of findings closely replicates those from Study 3 (see Figure 2).

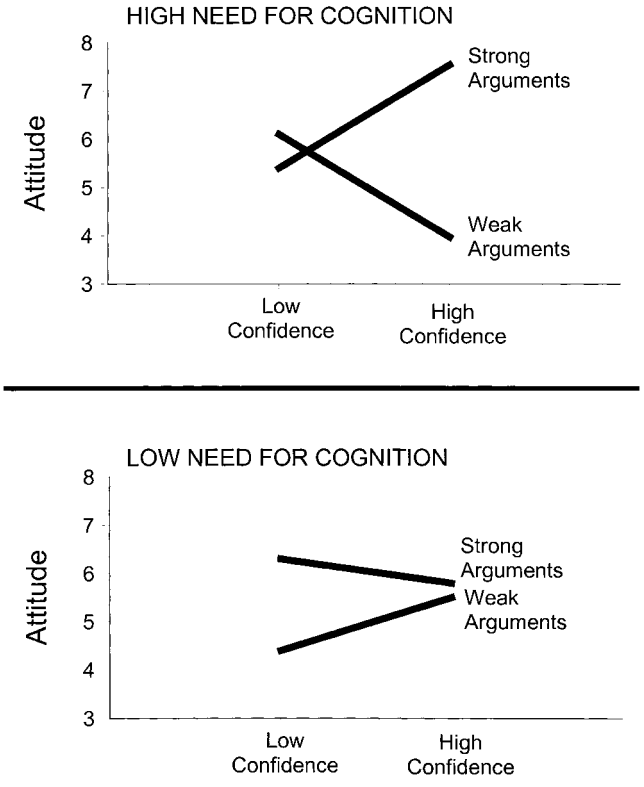

Figure 3. The two-way interaction between argument quality and the thought confidence manipulation for high need for cognition participants (top panel) and low need for cognition participants (bottom panel).

Discussion

The results of Study 4, in which we used new operationalizations of thought confidence and elaboration, were highly consistent with the self-validation hypothesis and the prior studies. That is, the confidence with which participants held their thoughts had opposite effects on persuasion depending on the dominant response elicited by the message. When participants were exposed to the strong version of the message, they generated mostly favorable cognitive responses and tended to show greater attitude change when these thoughts were held with high rather than with low thought confidence. When participants were exposed to the weak version of the message, however, they generated predominately negative thoughts, and the effect of confidence on attitudes was reversed. That is, when thoughts were mostly unfavorable, participants showed less attitude change when they had high as opposed to low confidence in their own thoughts.

The interaction between argument quality and confidence also showed that the effect of argument quality on attitudes was greater when high rather than low thought confidence was induced. With high levels of confidence in their own cognitive responses, participants viewed their positive and negative thoughts about the arguments as valid and relied on them in forming attitudes. However, when doubt (i.e., relatively low confidence) in participants' cognitive responses was induced, they viewed their positive and negative thoughts as less valid and relied on them less in forming attitudes. This result also replicates the findings of our previous studies. It is important to note that the results in support of the self-validation hypothesis were apparent only for the high need for cognition participants, who are more chronically motivated to engage in extensive thinking. This finding provides a conceptual replication of the findings from Study 3 and also is consistent with the notion that metacognitive influences on attitudes and judgments tend to be more pronounced to the extent that people have the motivation and ability to engage in considerable thinking.

The effects of this study are especially interesting to compare with prior work on need for cognition and persuasion. Past studies have been reasonably consistent in their finding that individuals who are high in need for cognition are more responsive to the quality of the arguments in a persuasive message than are individuals who are low in need for cognition (see Cacioppo et al., 1996, for review). The current study shows that the impact of argument quality on attitudes for high need for cognition individuals can be eliminated when these people lose confidence in the thoughts that they have generated. That is, generating appropriate thoughts to strong and weak messages is only one factor in producing argument quality effects on attitudes. People also need to have confidence in the validity of the thoughts that they generate.

General Discussion

Prior conceptual treatments of the role of cognitive responses in persuasion have focused on the number of thoughts and the valence of thoughts people generated during message processing as crucial determinants of attitude change. The present research provides initial support for another important factor. Specifically, we show that the extent to which people have confidence in the validity of their cognitive responses can play a significant role in persuasion. In accord with the self-validation hypothesis, the effects of the direction of a person's cognitive responses were greater for those participants with high thought confidence than for those with relatively low thought confidence. That is, the valence of a person's thoughts mattered more in determining attitudes when the thoughts were held with high rather than with low confidence. In operational terms, as thought confidence increased, valenced cognitive responses were more predictive of attitudes.

It is important that, across our four studies, the self-validation hypothesis was supported whether thought confidence was measured or manipulated. We also used two different kinds of measures of thought confidence—assessing confidence in each individual thought or in all of one's thoughts. We measured confidence both before and after attitude expression. We manipulated confidence in thoughts in two different ways, both using a misattribution procedure and providing in-group feedback on participants' thoughts. We also used different ways of varying the valence of thinking. In one study, people were instructed to generate positive or negative thoughts, whereas in other studies, we varied thought valence by manipulating the cogency of the arguments contained in the communication. None of these differences changed the self-validation effects we observed. That is, with respect to attitude change, the current research shows that when people's thoughts are largely favorable (either because people are instructed to have favorable thoughts or because favorable thoughts are naturally produced by strong arguments), increasing thought confidence (whether measured or manipulated) increases persuasion. On the other hand, when people's thoughts are largely unfavorable (either because people are instructed to counterargue or because unfavorable thoughts are naturally produced by weak arguments), increasing thought confidence reduces persuasion.

Another contribution of the present research is to specify under what circumstances the evaluations of one's own thoughts are more likely to influence one's judgments. We postulated that the assessment and impact of the validity of one's thoughts on attitudes is not typically automatic but instead requires some attention and cognitive effort. That is, to attempt to implement a metacognition (i.e., thoughts about one's own cognitive responses), people typically use controlled thinking. To motivate participants to elaborate on the information presented, in Studies 1 and 2 we used a topic with high personal relevance, and participants explicitly were asked to pay attention to and think about the information. In Study 3, participants were divided into two different groups according to their own reports about the extent to which they paid attention to the message and thought about its content. In Study 4, a stable individual-differences assessment—the Need for Cognition Scale—was used to classify those high versus low in thinking. Across the studies, it was clear that self-validation effects are fostered when motivation and ability to think are high rather than low.

Finally, across the studies, we were able to demonstrate that the effects of thought confidence on attitudes are not accounted for by related constructs. Thus, in Study 1 we showed that effects of thought confidence on attitudes remained even after we controlled for the likelihood and desirability of the consequences mentioned in the thoughts. In Study 2, we showed that the effects of thought confidence on attitudes remained even after we controlled for attitudinal confidence.

Enhancing Attitude–Thought Correlations

Beyond the conceptual advance of the current research in providing a more complete understanding of the processes of persuasion, on a practical level, the current investigations suggest that persuasion researchers might get respondents to rate their thoughts not only for valence but also for subjective confidence. Prior to conducting this research, we speculated that although significant attitude–thought correlations are typically found when elaboration likelihood is high (see Petty & Cacioppo, 1986, for a review), these correlations may mask differences that exist between individuals who are relatively high versus low in thought confidence. To provide the most powerful test of this hypothesis, we combined the data from all four studies for participants who were high in elaboration likelihood. Specifically, this analysis included individuals who were high in self-reported elaboration in Study 3, individuals who were high in need for cognition in Study 4, and all the participants from the first two studies, as they were all given instructions to pay very close attention to the material. It is important to note that because in Study 2 participants were instructed to list either only positive or only negative thoughts, the thought favorability index for these participants was computed simply as the number of positive or negative thoughts generated. For all other participants in this analysis, we computed the index by subtracting the number of negative thoughts from the number of positive thoughts and dividing this difference by the total number of thoughts listed.

As is typical for high elaboration individuals engaging in extensive thought, the attitude–thought valence correlation in this sample overall was significant ($r = .49$, $p < .001$). As predicted, however, this overall correlation masked the difference between the correlations found for those who were high in thought confidence ($n = 118$, $r = .66$, $p < .001$) and those who were low in thought confidence ($n = 116$, $r = .29$, $p < .01$). Although both correlations were significant, they were also reliably different from each other ($z = 3.77$, $p < .0002$). Thus, considerable predictive

utility can be gained by assessing confidence in thoughts in addition to favorability of thoughts.

These findings are consistent with previous research on metacognition in showing that although there is variability in people's awareness of their thoughts and their applicability (Cornoldy & Vianello, 1992), what people think about what they think can have an important impact on attitudes and behaviors. Although previous work has clearly shown that persuasion depends on the thoughts that are generated in response to a message—at least when the elaboration likelihood is high (Petty et al., 1981)—the present research demonstrates that what people think about their cognitive responses is a potentially important moderating variable. For instance, although someone might generate positive thoughts in response to a message, the extent to which these thoughts result in a positive attitude depends on the person's confidence in these thoughts. Similarly, although someone might generate negative thoughts in response to a message, he or she is more likely to form a negative attitude when these thoughts are held with confidence.

Manipulating Confidence

The present research found not only that metacognitive judgments of confidence can be measured and can play an important role in persuasion but also that what people think about their own thoughts in response to a persuasive communication can be manipulated. In Studies 3 and 4, the extent to which participants had confidence in the validity of their cognitive responses to the message was affected by the content of an ostensibly unrelated task.

The possibility of varying the confidence people have in the validity of their thoughts might have important implications for other fields outside the persuasion domain. For example, research on self-efficacy (e.g., Bandura, 1997) has suggested that to meet objectives, it is necessary not only to have thoughts directed toward these objectives (e.g., positive thoughts) but also to have confidence in the validity of these thoughts. Work by S. Ellis and Kruglanski (1992) demonstrated that people have metathoughts about their own levels of *epistemic authority* (cognitive expertise) in specific domains. These assessments determine the extent to which people are capable of learning from different kinds of instructions. According to S. Ellis and Kruglanski, "only individuals who trust their ability to impose meaning on the experience may be capable of learning from repeated exposure, and of developing confidence that they understand what the situation is all about" (p. 370). Thus, metacognitive thoughts about the credibility and reliability of one's knowledge have important ramifications for actual learning and performance.

Link to Persuasion Theory

Our focus on a new dimension of thinking in the persuasion domain—thought confidence—has implications for current persuasion theory. That is, on the conceptual level, the current research indicates that there is a third important dimension of thinking in addition to the extent of thinking (i.e., amount) and the direction of thinking (i.e., valence), which have garnered the lion's share of prior research attention. Within the framework of the ELM of persuasion (Petty & Cacioppo, 1986), the current research provides evidence for a previously unexplored role that variables can take on in persuasion settings.

Prior research on the ELM has focused on four roles that persuasion variables can assume in different situations. For example, consider source variables such as expertise or attractiveness. According to the ELM, source variables are most likely to take on the role of peripheral cue when the elaboration likelihood is low, inducing change or resistance with relatively little thought through some relatively simple cognitive operation (e.g., "If an expert says it, it must be true"; see Chaiken, 1980; Petty, Cacioppo, & Goldman, 1981). On the other hand, when the elaboration likelihood is moderate, source variables are presumed to affect the amount of thinking that takes place (e.g., see DeBono, 1987; Heesacker, Petty, & Cacioppo, 1983). Finally, when the elaboration likelihood is high, source variables are postulated to bias thinking (e.g., Chaiken & Maheswaran, 1994) or serve as persuasive arguments (e.g., Petty & Cacioppo, 1984).

The current research documents another role for source (and other) variables. That is, under high elaboration conditions, source variables might influence attitudes by affecting people's confidence in their thoughts. For example, if people generated positive thoughts to a message only to learn that the message was from an untrustworthy source, confidence in those thoughts might be reduced, attenuating persuasion. Earlier, we outlined how this self-validation notion might account for the classic sleeper effect finding. That is, the reduction in thought confidence might only be temporary, such that over time, as confidence in one's favorable thoughts increased, the original impact of the message would be restored.

As another example of the potential utility of the self-validation framework, consider recent research on ease of retrieval processes (Schwarz et al., 1991). In persuasion paradigms, the ease of retrieval idea suggests that people who are asked to generate few favorable thoughts about a position can be more persuaded than can people who are asked to generate many favorable thoughts (see Wänke, Bless, & Biller, 1996). The dominant explanation for this effect is based on the availability heuristic (Tversky & Kahneman, 1973). This explanation begins with the assumption that generating few arguments is easy but that generating many arguments is difficult. When people have a hard time generating arguments, they might infer that there are few such arguments available, but when they have an easy time generating arguments, they might infer that there are many such favorable arguments. These inferences of argument availability translate into inferences about how good the position is (Rothman & Schwarz, 1998). The self-validation framework provides an alternative mechanism by which ease of retrieval effects can occur. That is, when it is easy to generate arguments, people might have more confidence in the arguments they generate than when it is more difficult to generate them. If people have more confidence in the favorable arguments they generate, more persuasion should result (Tormala, Petty, & Briñol, 2001; Wänke & Bless, 2000). Our point is not that the self-validation hypothesis necessarily explains ease of retrieval phenomena or the sleeper effect finding but rather that there may be numerous source, message, context, and recipient variables that influence attitudes by affecting peoples' confidence in their thoughts and that thereby have an impact on persuasion. These issues should be investigated in future studies.

Unanswered Questions

Is Confidence a Good Thing?

As with any new line of research, the current research answers some questions while raising others. For example, one might wonder if it is a good thing for people to have confidence in their thoughts. Ideally, thoughts held with great confidence would be better in some sense—more logical, compelling, or relevant—than are thoughts held with low confidence. However, the data from our studies suggest that this is not the case. First, in Study 2, we had objective judges rate thoughts for quality, and there was no relationship between a person's confidence in a thought and its rated quality. Of course, it could be that judges could not detect some actual quality difference that existed. However, in Studies 3 and 4, perceived confidence was manipulated across two groups who, because of random assignment, generated thoughts of equal quality. Yet when confidence in thoughts was manipulated to be low, people relied on these thoughts less than when confidence was manipulated to be high. These studies clearly indicate that people's confidence in their thoughts can be independent of the thoughts' actual quality.

The independence of subjective confidence and quality is not confined to persuasion situations. For example, work on jury decisions has established that the confidence with which a witness makes an identification is a strong determinant of whether people believe that the eyewitness's testimony is accurate (Cutler, Penrod, & Stuve, 1988; Lindsay, Wells, & Rumpel, 1981; Wells, Ferguson, & Lindsay, 1981). That is, other people are more likely to base their evaluations of guilt or innocence on a person's confident beliefs (e.g., "I am certain he is the criminal), much as people are more likely to base their own evaluations on their confident thoughts. However, the reliance on belief confidence in the jury instance is unfortunate given the consistently weak correlation between an individual's confidence and his or her accuracy (see reviews by Deffenbacher, 1984; Wells & Murray, 1983). Additional work is needed on when confidence is associated with accuracy and when it is not.

How Does Confidence Affect Other Belief Dimensions?

Future research should examine how thought confidence relates to other prominent dimensions of beliefs. In the current research, we showed that the effects of thought confidence could not be accounted for by the most popular dimensions of beliefs identified in prior work—likelihood and desirability. But how does confidence relate to these dimensions? In an initial study designed to explore this issue, we looked at how manipulated thought confidence affects the likelihood component of people's beliefs. In this study, 75 participants were asked to write down four consequences that they thought would be likely or four that would not be very likely to occur if marijuana were to be legalized. After listing these consequences, participants received the confidence manipulation that we used successfully in Study 3 (i.e., writing down past instances in which they experienced confidence or doubt). Then participants were exposed to each of the consequences they listed, and we assessed the likelihood of each occurring on a scale ranging from 0 (*no likelihood of occurrence*) to 100 (*certain to occur*). The four likely and four unlikely consequences participants listed were highly intercorrelated and were averaged within category prior to analysis.

As expected, a 2 (likelihood of consequence: likely vs. unlikely) $\times$ 2 (confidence: high vs. low) analysis of variance revealed a main effect of likelihood such that participants who were asked to generate likely consequences reported greater likelihood in the consequences they listed ($M = 67.52$, $SD = 15.12$) than did participants who were asked to generate relatively unlikely consequences ($M = 36.49$, $SD = 25.18$), $F(1, 71) = 43.46$, $p < .001$. There was no main effect for the confidence manipulation, $F(1, 71) = 0.01$, $p = .93$. More interesting, a significant Likelihood $\times$ Confidence interaction emerged, $F(1, 71) = 6.51$, $p < .05$. This interaction stemmed from the fact that confidence had opposite effects on the relatively likely versus the relatively unlikely consequences that participants listed. For the relatively likely consequences, participants tended to report more likelihood with high ($M = 72.59$, $SD = 11.05$) rather than with low ($M = 60.22$, $SD = 17.44$) confidence, $F(1, 71) = 3.62$, $p = .06$. For the relatively unlikely consequences, however, likelihood tended to be higher for low ($M = 41.30$, $SD = 29.91$) than for high ($M = 29.76$, $SD = 14.98$) confidence, $F(1, 71) = 2.93$, $p = .09$. The most important aspect of this finding is that confidence was not linearly related to likelihood; this suggests that when one is dealing with relatively likely consequences, confidence and likelihood are positively related but that when one is dealing with relatively unlikely consequences, confidence and likelihood are negatively related. Confidence might be similarly related to desirability. That is, increasing confidence in relatively desirable consequences might increase the consequences' desirability, but increasing confidence in relatively undesirable consequences might cause them to be rated more negatively.

What Determines Confidence?

In addition to examining the impact of confidence on other belief components, it is also important to study the determinants of confidence. Consistent with some prior research, it seems clear that thought confidence does not necessarily stem from the objective accuracy or inherent quality of the thoughts (see Metcalfe, 1998). In the current research we measured confidence directly and manipulated it using some fairly direct procedures. We found that when prior instances of confidence were salient, people reported a high degree of confidence in their recently generated thoughts (Experiment 3) and that when people's thoughts were shared by in-group members, thought confidence was increased (Experiment 4). As implied earlier, there may be a wide variety of variables that instill or reduce confidence in people's thoughts.[6] The factors affecting confidence likely range from individual variables such as a person's current mood state (Tiedens & Linton, 2001; Wyer, Clore, & Isbell, 1999) or how frequently or easily the thought comes to mind (see Arkes, Boehm, & Xu, 1991; Tormala et al.,

[6] Because Studies 3 and 4, which manipulated confidence, did not contain a pure control, we cannot tell for sure whether the confidence manipulations we used increased confidence over some normal baseline of confidence, whether the doubt conditions reduced it, or whether both occurred. Future work should address this. In the meantime, it is clear from our studies of measured confidence that natural variations in confidence are strong enough to produce self-validation effects.

2001) to situational factors such as the credibility of the source associated with the message. If a wide variety of persuasion variables influence people's confidence in their thoughts, then the self-validation hypothesis may ultimately prove useful in providing a novel explanation for diverse attitude change phenomena.

Other Roles for Confidence

In the current studies, we either assessed thought confidence following thought generation or manipulated confidence after people had processed a message. If confidence had been manipulated prior to message exposure, its role in the persuasion process would likely have been different. For example, in one study, Tiedens and Linton (2001) had participants write about a sad experience in which they felt uncertain about what was happening or a sad experience in which they felt certain. Following this induction, participants received a message containing strong or weak message arguments. The primary result was that uncertain participants engaged in greater information processing (i.e., greater attitudinal differentiation of strong from weak arguments) than did certain participants. In accord with the ELM (Petty & Cacioppo, 1986), it seems likely that confidence, like other variables, can take on multiple roles in persuasion settings. When confidence is induced prior to message exposure and elaboration is not constrained to be high or low by other variables, confidence might affect the extent of information processing, with confident people engaging in less thought than people who are lacking in confidence (Tiedens & Linton, 2001). If confidence is induced after extensive message processing, as in the current research, however, it appears to affect confidence in the thoughts that have been generated—enhancing persuasion if the thoughts were favorable but reducing persuasion if the thoughts were unfavorable. If confidence is induced prior to a message and elaboration is constrained to be low (e.g., by the presence of distraction; Petty et al., 1976), then confidence might encourage using one's own attitude as a peripheral cue. If confidence is induced prior to a message and elaboration is high, then confidence might enhance attitudinally biased information processing (Lord, Ross, & Lepper, 1979). The multiple possible roles for confidence should be explored in future research.

Metacognitions About Content Versus Process

Finally, we note that the current work has focused on metacognitions about the contents of one's thoughts. It may prove equally fruitful to examine metacognitions about one's thought processes in persuasion settings. For example, to the extent that people become aware that they have followed the peripheral route to persuasion and that this has produced an unsatisfactory outcome, they might switch to the central route (Mazursky & Shul, 2000). Prior work on how one's desired level of confidence matches one's obtained level is consistent with a metacognitive perspective on persuasion processes (see Bohner, Rank, Reinhard, Einwiller, & Erb, 1998; Chaiken et al., 1989). Clearly, much work on metacognitive processes in persuasion remains to be done. The current research provides one step in what may prove to be a wide-ranging endeavor.

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