IT’S THE TYPE OF THINKING THAT COUNTS:
A METACOGNITIVE ANALYSIS OF THE EFFECTS OF PROCESSING
STRATEGIES ON ATTITUDE CERTAINTY

DISSERTATION

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ABSTRACT

People can process the exact same persuasive message using very different information seeking or processing strategies. In particular, past research has contrasted directing one’s attention to generating negative or positive thoughts to a message with processing the same message by focusing on whatever thoughts are naturally prevalent. Researchers have found that when successful, directing one’s attention to considering positive thoughts produces more favorable attitudes than an undirected control, whereas directing one’s attention to considering negative thoughts produces more negative attitudes relative to an undirected control. Interestingly, past research has not spoken to the consequences of directing one’s thinking, in either a positive or negative fashion, when the attempt to find merit or fault is unsuccessful. The present research puts forth a metacognitive framework to predict and explain potential differences in how type of thinking may influence the underlying certainty with which individuals hold their attitudes. Specifically, it is argued that individuals often reflect on how they arrived at a particular attitude or judgment. Furthermore, when individuals perceive themselves to be aware of both their potential positive and negative reactions to a message (versus just one side being salient) they express greater degrees of certainty in the attitude that was reached. This finding is replicated across multiple experiments. In addition evidence is provided that the effects of certainty are consequential. In total, the present research
reveals new effects of how people arrive at an attitude for the underlying certainty associated with that attitude. Implications for the literature on persuasion and metacognition are discussed.
Dedicated to the two most amazing women I have ever known:

Stacy and Catherine Rucker
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Currently popular models of persuasion such as the Elaboration Likelihood Model (ELM; Petty & Cacioppo, 1986; Petty & Wegener, 1999) and the Heuristic Systematic Model (HSM; Chaiken, Liberman & Eagly, 1989; Chen & Chaiken, 1999) recognize that people often sift through and process the exact same information with different goals in mind. For example, some people might process a message in a relatively unbiased way, being undirected in their thinking and focus on whatever thoughts naturally come to mind. In contrast, other individuals might be biased in their thinking and direct or focus their efforts on trying to adopt or refute a message position (Lord, Ross, & Lepper, 1979; Kruglanski, 1996; Kunda, 1990; i.e., engage in biased processing, Petty & Cacioppo, 1986). As documented shortly, the existing literature is replete with instances in which individuals are successful in their attempts to find strengths or weaknesses in a message.

The focus of this dissertation, however, is on instances in which people are not successful in their biased processing efforts. To illustrate, imagine a manager interviewing three potential employees. The first candidate happens to be an acquaintance from high school and the manager makes an effort to write down and highlight all the positives about the employee. The second candidate has no relation to
the manager and thus the manager writes down whatever reactions she naturally has to the employee. Finally, the third candidate graduated from a rival university, and thus the manager makes an effort to focus on and write down any potential faults or shortcomings of the employee. Upon completing the interviews, the manager finds that all three candidates are extremely qualified and the manager has an equally positive attitude towards each of the candidates. What are the implications of the manager’s initial bias for her decision to hire? Is she more likely to hire the candidate that she interviewed in a relatively natural fashion or the candidate that she gave preference to by focusing on her positive thoughts? Could the manager possibly be more inclined to hire the candidate that she tried to find something wrong with? Based on the entirety of past research on type of thinking in persuasion, if a person arrives at the same attitude with the same degree of cognitive effort, it should not matter what the person’s goals were in processing. Consequently, past research would predict that, if the manager relies on her attitude, the decision should be the same regardless of the initial bias present.

This dissertation challenges the notion that attitudes that are equivalent in their valence and extremity will always function similarly even if they were formed with different goals in mind. Instead, it is proposed that the process by which an attitude is formed or changed has measurable and important consequences. Specifically, this dissertation examines how the type of thinking individuals engage in to reach an attitude influences the confidence or conviction with which people hold their attitude. Conviction associated with people’s attitudes following either a directed attempt to find fault in a message (directed-negative) or a directed attempt to find merit (directed-positive) is contrasted with people’s default thinking propensity (undirected). It is hypothesized that
directing people to consider either the faults or merits of a message can lead to attitudes held with greater conviction and certainty. Whether directed positive or negative thinking leads to greater certainty depends on the type of thoughts naturally elicited by the message. In particular, the hypothesis is that directing people to focus on information that is not naturally salient can lead to greater conviction and certainty in the resulting attitudes. Furthermore, this difference in certainty is proposed to be a result of the metacognitions that stem from directing one’s thinking to consider information that is normally not salient. Before explaining the core hypotheses centering on attitude certainty and delving further into this topic, the current literature on types of thinking is reviewed.

Literature Review: The Effects of Type of Thinking on Attitudes

A number of factors can influence whether people direct their attention towards finding faults or merits in a message. For instance, factors that have been shown to bias participants’ processing include high levels of knowledge on the issue (e.g., Johnson, Lin, Symons, Campbell, & Ekstein, 1995), the credibility of the source (Chaiken & Maheswaran, 1994), moods (Petty, Schumann, Richman, & Strathman, 1993), impression management concerns (Leippe & Elkin, 1987), negative information regarding one’s health (Liberman & Chaiken, 1992), and pre-existing attitudes (Lord et al. 1979; for additional reviews see Petty & Cacioppo, 1986; Petty & Wegener, 1999).

Perhaps the best known and cited studies on the effects of individuals’ type of thinking on attitudes comes from Lord and colleagues (1979). In this research, participants who were either proponents or opponents of the death penalty were exposed to a study on the effects of capital punishment on crime deterrence. Although all
participants read the same method and procedure for how the study was conducted, half the participants were informed the results of the study supported capital punishment as an effective deterrent, and half the participants were given results that suggested capital punishment was not an effective deterrent. When asked to indicate how well conducted and convincing the study was, participants exhibited a bias consistent with their initial position. Although the study procedures and method were always identical, those who favored capital punishment felt the study was better conducted when it supported the death penalty than when it did not; for those who were against capital punishment the reverse was found. These results can be understood from a biased processing perspective (see Petty & Cacioppo, 1986; Petty & Wegener, 1999). That is, individuals who received a message that challenged their viewpoint were more likely to seek out and find faults in the procedure, whereas those who received a message that supported their position were more likely to seek out and find merits in the procedure. Furthermore, individuals appeared to succeed at this goal as they showed more negative/positive attitudes when they had sought out the faults/merits of the study.

The work of Lord et al. (1979), as well as the opening example of this paper, focused on natural variance in how people process information. In the Lord et al. case, information processing was biased by the person’s pre-existing attitude. However, how people process information can be experimentally manipulated as well (e.g., Killeya & Johnson, 1998; Tormala & Petty, 2002). For example, in an experiment directly manipulating participants’ type of thinking, Killeya and Johnson (1998) instructed participants to evaluate a message by focusing on the message merits, faults, or simply attending carefully to the message presented. In addition, Killeya and Johnson
manipulated the strength of the arguments presented to be relatively strong (i.e., compelling and valid) or weak (i.e., unconvincing and specious; see Petty & Cacioppo, 1986). Importantly, the arguments were not so strong or weak as to prevent biased processing, a point that will be returned to.

Killeya and Johnson found that directing individuals to consider the negatives of a message led people to endorse more negative attitudes towards a strong message, compared to the other conditions. Furthermore, directing individuals to consider the positives led to a more positive attitude towards weak messages compared to the other conditions. Killeya and Johnson reasoned, in the case of strong arguments, participants’ natural default is to consider the merits and thus undirected individuals form positive evaluations and show attitudes similar to individuals who are instructed to consider the positives. Directing people to consider the negatives, however, leads people to seek out negative information and, upon finding it, undermines attitude change. In the case of weak arguments, participants’ natural tendency is to generate negative thoughts, and therefore undirected individuals show attitudes similar to those instructed to consider the negatives. Those instructed to consider the positives of the message, however, are more likely to focus on merits and thus form more positive attitudes. In short, directing people’s thinking biased people’s underlying thoughts, which in turn influenced their attitudes. This was most notable when the direction of the bias went against participants’ natural processing tendencies (see also Tormala & Petty, 2002; McGuire, 1964).

In summary, common to past efforts on types of thinking is the notion that focusing one’s thinking, either towards the negatives or positives, biases participants’ thoughts and influences the resulting attitude in a thought-consistent manner.
Limitations of Past Research

Although the importance of past research on biased processing is clear, one noteworthy limitation is that prior research was primarily interested in, and consequently focused solely on, situations where directed thinking, positive or negative, was successful. That is, the extant body of literature examined situations where people were instructed to find faults or merits and were successful in achieving this goal. This is evident by the fact that attitudes and thoughts always followed the direction of the thinking (i.e., more positive after directed-positive thinking; more negative after directed-negative thinking).¹ Unexamined, are situations where individuals engage in a directed form of thinking but are unsuccessful in their efforts, as illustrated by the example of the manager who finds all three candidates qualified regardless of the manager’s thinking focus.

For instance, first consider the case of directing one’s attention to attempting to find fault or counterargue a message position. Although less agreement often results from considering the faults of a message this does not mean it is an inevitable outcome. There are often situations where individuals, despite attempting to find fault in a message, may lack the ability to do so. For example, distraction that is present during a message can prevent people from finding fault or counterarguing (Petty, Wells, & Brock, 1976). Similarly, individual differences such as having insufficient knowledge or experience in defending one’s position can hinder an individual’s ability to find fault as

¹ Sometimes undirected thinking and directed thinking led to equivalent attitudes if the directed thinking matched participants’ default response (see Killeya & Johnson, 1998). For example, if given a strong message both directed-positive and undirected thinking led to positive attitudes. However, this still marks a successful effect of the thinking prompt.
illustrated in McGuire’s (1964; McGuire & Papageorgis, 1962) classic work on cultural truisms.

For non-truism topics, perhaps the most obvious reason a non-distracted person might fail in an effort to find fault is that the message contains such compelling reasons for the advocated position that it is very difficult or impossible to find genuine faults in the arguments. For example, an individual may truly wish to refute an opponent’s point, but realize, upon reflection, that the point is valid and superior to one’s own. In such situations, attempting to find fault should not reduce agreement relative to being undirected in one’s thinking, as it should not produce a large number of negative thoughts. Thus, directing one’s attention to finding fault is a process that can hinder persuasion, but only if successful. The same logic can be applied to directing one’s attention to finding merit. For example, a person may really want to believe that a new investment opportunity will increase one’s income, but after careful examination realize it is nothing more than a pyramid scheme likely to leave the person in a poorer state. Put differently, although people may often focus their thinking towards the merits or faults of a message, this does not necessarily equate to success in their efforts.

Metacognition and Attitude Certainty

The present paper examines situations where people are unsuccessful in either their efforts to find fault or to find merit in an advocated position. As mentioned previously, this might typically occur when the message arguments for a position are clearly strong (i.e., convincing, compelling) or weak (i.e., unconvincing, specious). Because the type of thinking is not expected to differentially influence participants’ actual underlying thoughts to a message in such instances, attitudes are likely to be
unaffected by an attempt to find fault or merit. However, the present paper applies a metacognitive framework to understand consequences type of thinking may have for the certainty with which people hold their attitudes.

*Metacognition* refers to the idea that people can have thoughts about their thoughts or thought processes (see Jost, Kruglanski, & Nelson, 1998; Petty, Briñol, Tormala, & Wegener, in press). Emerging work on metacognition in persuasion supports the notion that people can reflect upon and think about the thinking they have done in response to a persuasive message (e.g., Petty, Briñol, & Tormala, 2002; Briñol, Petty, & Tormala, 2004). This reflection about one’s thoughts can have a unique impact that is separate from the specific thoughts regarding the message itself. For example, recent research on successful efforts to counterargue suggests that when people succeed at resisting a message (i.e., exhibit no attitude change) they sometimes reflect on why their resistance attempt was successful (Tormala & Petty, 2002, 2004). Furthermore, this reflection can influence the certainty of the attitude, independent of the actual valence or extremity of the attitude.

Returning to the issue at hand, the key question of interest is: what occurs when people are *unsuccessful* in their efforts to find either fault or merit? As mentioned previously, if their efforts are unsuccessful participants are expected to have relatively

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2 It is conceptually possible for people who fail to find fault/merit to have less/more favorable attitudes than people who did not try to find fault/merit if they make a simple inference that “the position must be bad/good if I tried to find fault/merit and could not.” Or, people who fail to find fault/merit might have more favorable/unfavorable attitudes than people who did not try to find fault if they make the inference that “the position must be very favorable/unfavorable indeed if I could not find fault/merit.” However, if these attitude effects were to occur it would complicate interpretation of attitude certainty effects since attitudes of different extremity would be compared. Fortunately, pilot testing of topics and messages made it possible to hold the amount of attitude change constant across experimental conditions so that certainty effects could be examined unconfounded by attitude extremity.
equivalent attitudes regardless of the type of thinking they were attempting. In the present dissertation, it is argued that, although attitudes are expected to be equal, the type of thinking may have implications for attitude certainty. Attitude certainty is defined as a subjective feeling of conviction or validity in one’s attitude and/or the extent to which an individual believes his or her attitude is correct (Festinger, 1950, 1954; Gross, Holtz, & Miller, 1995). As a key determinant of attitude strength, increased certainty has been shown to enhance the attitude-behavior relationship (Fazio & Zanna, 1978), render attitudes more resistant to change (e.g., Bassili, 1996; Krosnick & Abelson, 1992; Swann, Pelham, & Chidester, 1988), and produce more persistent attitudes (Bassili, 1996).

One influence on attitude certainty is how knowledgeable one feels. That is, all else equal, increases in perceived knowledge are hypothesized to be associated with increases in certainty. Equally important, prior research suggests that increases in knowledge are more prone to have an impact on attitude certainty than on the valence or extremity of the attitude itself (Krosnick, Boninger, Chuang, Berent & Carnot, 1993; Rucker, Petty, & Briñol 2005). For example, in research examining the association of perceived knowledge with other constructs, Krosnick and colleagues (1995) found, across four studies, the correlation between knowledge and attitude certainty was stronger than the relationship between knowledge and attitude extremity. Similarly, Rucker, et al. (2005) found, in conditions where increases in knowledge were hypothesized, the certainty of attitudes changed, but the extremity did not. This is likely a result of the fact that feeling one is more knowledgeable does not necessarily convey one should become more extreme in one’s position; rather, feeling more knowledgeable reinforces and
signals that whatever attitudes one has already reached can be trusted (i.e., held with
greater certainty).

Types of Thinking and Attitude Certainty: A Metacognitive Perspective

It is hypothesized that type of thinking is most likely to influence attitude
certainty when a particular thinking focus (e.g., directed-negative) leads to greater
perceptions of overall knowledge than another (e.g., undirected, directed-positive). This
dissertation posits this effect occurs when directed thinking leads individuals to focus on
information that they do not naturally focus on, leading to greater perceptions of
knowledge about the attitude object and thus greater attitude certainty. The first situation
examined in the present thesis is the case of solely strong or positive arguments
supporting a message topic. In such a situation, a directed-negative search would reveal
little or no negative information; therefore, type of thinking should have relatively little
influence on individuals’ attitudes. However, whereas past research would suggest
equivalently valenced and extreme attitudes derived from different thinking strategies
(i.e., directed-negative, directed-positive, undirected search) were functionally
equivalent, this dissertation argues that type of thinking may have implications for
attitude certainty. For example, if people are given extremely positive information about
an attitude object in a message this will naturally raise their awareness of the positive
information about the product. Similarly, if they are instructed to direct their attention to
considering the positive information about the product their positive thoughts about this
information will also be salient. However, if people are directed to consider potential
negatives associated with the message, they will be aware of both the potential positives,
which are naturally salient, as well as the (absence of) negatives.
The awareness a person has considered the potential negatives should lead one to be aware not only of the merits of the message position, but of the lack of negative information associated with the message position. Essentially, a person should realize, “Because I searched for potential negative information and found little, I am now informed about both the positive and the negative information.” Thus, there should be a difference in perceived knowledge based on an awareness of having considered one’s negative reactions. If individuals feel more knowledgeable after having considered the negatives, in the scenario just described, they should hold their attitudes with greater certainty. This gives rise to the first hypothesis tested in this dissertation:

**Hypothesis 1:** Given extremely strong arguments, type of thinking will not influence attitude extremity. However, directed-negative thinking is expected to be associated with greater attitude certainty than directed-positive or undirected thinking. This should be a result of directed-negative thinking making participants aware that they know about both sides of the issues. That is, not only do they know the positive information contained in the message, but they are aware of the lack of negative information.

Although this first hypothesis predicts directed-negative thinking should enhance certainty relative to directed-positive and undirected thinking, this does not mean this will always be the outcome of type of thinking. Based on the logic outlined previously, one can predict when directed-positive thinking will lead to greater attitude certainty. In particular, if a message is clearly weak, rather than strong, people should arrive at a negative attitude regardless of the type of thinking in which they engage. Furthermore, a person’s natural response should be to recognize the faults of the message when instructed simply to think about it. Directing an individual to consider the faults would lead to a similar response as an undirected thinking condition. However, instructing a
person to consider the potential merits of a weak message should lead them to be aware that, in addition to there being many pieces of negative information there are also few pieces of positive information. That is, people might think, “Because I searched for potential positive information and found little, I am now informed about both the negatives and the positives.” Thus, there should be a difference in perceived knowledge based on an awareness of having considered one’s positive reactions. Consequently, in the case of weak messages, directed-positive thinking should yield greater attitude certainty leading to the following hypothesis:

**Hypothesis 2:** Given extremely weak arguments, type of thinking will not influence attitude extremity. However, directed-positive thinking is expected to be associated with greater attitude certainty than directed-negative or undirected thinking. This consequence should follow from directed-positive thinking making participants aware that they know about both sides of the issues. That is, not only do they know the negative information contained in the message, but they are aware of the lack of positive information.

Finally, as noted previously, it is important to stress that attitudes held with greater certainty have a multitude of important consequences. Specifically, attitudes held with greater certainty tend to exert a stronger influence on behavior (Fazio & Zanna, 1978; Tormala & Petty, 2002), persist longer over time (Bassili, 1996), and tend to be more resistant to attempts to change them (Swann et al., 1988; Tormala & Petty, 2002). This paper examines the influence of increases in attitude certainty on the influence of attitudes on behavioral intentions. In particular, this gives the third hypothesis:

**Hypothesis 3:** Attitudes held with greater certainty stemming from directed thinking should be consequential such that they are more likely to predict people’s behavioral intentions.
A model incorporating the three core hypotheses is provided in Figure 1.

Overview of the Present Research

This dissertation examines the influence of type of thinking for the certainty with which individuals hold their attitudes. Intentionally focused on are situations where arguments are extremely strong (i.e., clear positives, few negatives) or weak (i.e., clear negatives, few positives) so that attitude change is held equivalent as a function of thinking directions. If more moderate messages were used this might produce differences in the overall extremity of the attitudes presented. Although this would not necessarily undermine the value of increased attitude certainty, it would provide a less clear test. By holding extremity constant, any resulting differences can be more readily attributed to the metacognitive explanation proposed than associated differences in extremity.

Experiments 1, 2, and 3 test the first hypothesis that greater certainty will be associated with directed-negative thinking when the arguments presented are strong. Experiments 4 and 5 test the second hypothesis that greater certainty will be associated with directed-positive thinking when the arguments presented are weak. Experiment 6 tests the mechanism outlined in Experiments 1-5 by manipulating participants’ perception of whether they are aware of both sides in a more direct manner. Finally, Experiment 7 tests the third hypothesis, that, where differences in certainty are expected, attitudes are also more inclined to predict behavior.
CHAPTER 2

EXPERIMENT 1

The first experiment was designed to test the hypothesis that, given clearly strong arguments, directed-negative thinking would lead to greater certainty than both undirected and directed-positive thinking. This was tested in context of a novel aspirin product. As mentioned previously, because the primary interest was in comparing differences in attitude certainty that follow directed-negative, directed-positive and undirected thinking, materials were developed that would lead to comparable amounts of attitude change. If the groups differed in the valence or extremity of their attitudes, the interpretation of the certainty results would be complicated as more extreme attitudes are typically stronger on other dimensions (see Petty & Krosnick, 1995). Therefore, the messages included very compelling arguments and no negative information; furthermore the messages elicited relatively few negative thoughts, even when participants were asked to focus on their negative thoughts. Arguments used in Experiment 1 are located in Appendix A.

Experiment 1 included an undirected, directed-positive, and directed-negative thinking condition. The inclusion of a directed-positive condition helps to rule out the

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3 A portion of the data presented in this dissertation was previously reported in Rucker and Petty (2004).
possibility that directed thinking in general may lead to more certainty. If directed thinking in general does not increase certainty, but it is something unique about directing one’s attention to the negatives of an extremely strong message, then differences in certainty should only be observed in the directed-negative condition.

Method

Participants

Seventy-seven Ohio State University undergraduates served as participants in exchange for partial fulfillment of a requirement in their introductory psychology course. Participants were randomly assigned to one of four conditions (control, undirected thinking, directed-positive thinking, directed-negative thinking).

Procedure

Upon entering the lab, the students were told that they would be participating in a study on consumer research. Participants were informed, as in all studies, that the entire study would be completed on a computer. Participants were the told that they would provide their attitudes and opinions on a product that was selected at random by the computer. Next, participants began the task on the computer that had a similar set of written instructions to reiterate the nature of the task. All participants were informed they had been selected to receive new information about a new brand of aspirin, “Relieve.” In actuality, this was a fictitious product selected to avoid any influence of prior product attitudes in this initial experiment.

Participants in the control condition provided their attitudes in the absence of any information about Relieve other than it was a brand of aspirin. Participants in the three experimental conditions were given a thinking instruction and then exposed to an
advertisement for the product. Depending on condition, instructions were given for participants to focus on either their thoughts (undirected thinking), positive thoughts (directed-positive thinking), or negative thoughts (directed-negative thinking).

After the thought instructions, all experimental groups read an advertisement (see Appendix A) that contained three cogent arguments designed to be strong and difficult to counterargue. Specifically, in a pilot study nineteen participants were presented with each of the three arguments and asked to list a negative thought or to type "none" if they could not produce one. Across all participants, only 26% of thoughts listed were negative. The remaining 74% were reported as “none,” indicating that participants did not have any natural negative thoughts. Thus, the arguments were shown to elicit few negative thoughts, even when people were directed to consider their negative thoughts.

After participants read the advertisement, each of the three arguments in favor of the product was repeated, one at a time, on the computer screen (see Appendix A). Participants were instructed, depending on condition, to provide a thought, positive thought, or negative thought. Participants were also informed that, in the event they had none of the requested thoughts, to type “none” (see Appendix A for complete instructions). Following the thought listing, participants’ attitudes and attitude certainty were assessed. Participants were then thanked and debriefed.

**Independent Variable**

Participants in the experimental groups were directed to focus on thoughts, positive thoughts, or negative thoughts. Participants in the control condition did not receive an advertisement or a thought listing task, as these participants simply served to
establish pre-message attitudes. The instructions for participants in the undirected condition were as follows:

You will be given information about a new aspirin that may be test marketed in Columbus in the upcoming year.

A common method of gauging consumers’ response to products is to assess what THOUGHTS people have about using the products. Therefore, you will be asked to focus on and list the THOUGHTS you have about using the aspirin you read about.

Of course, you might not have any THOUGHTS about using the aspirin you read about. If you do not have any THOUGHTS about the aspirin you read about, we would like you to type the word NONE in capital letters.

In the directed-positive condition the word “POSITIVE” was added before each instance of the word “THOUGHTS,” whereas in the directed-negative condition the word “NEGATIVE” was added before each instance of the word “THOUGHTS.” See Appendix A for images of actual computer screens.

**Dependent Variables**

**Thoughts.** Two judges, blind to the conditions from which the thoughts came, coded the thoughts as positive, negative, neutral, or absent (i.e., a none response). Interrater agreement, across all studies was above 90%, and disagreements were resolved through discussion.

**Attitudes.** Attitudes towards the aspirin, Relieve, were assessed using four 9-point semantic differential scales (good-bad, favorable-unfavorable, positive-negative, and support-oppose). Negative descriptors were anchored at 1 and positive descriptors anchored at 9. These 4-items formed an aggregate measure of attitudes ($\alpha = .97$).

**Attitude certainty.** Attitude certainty was assessed with a composite of two items ($\alpha = .93$). Participants were asked, “How certain are you of your feelings toward
Relieve?” and “How convinced are you of your attitude toward Relieve?” These items were adapted from past research (Fazio & Zanna, 1978; Tormala & Petty, 2002). Both items were completed on 9-point scales with 1 = “not at all” and 9 = “extremely.”

Results

Thoughts

Thoughts were analyzed using a mixed ANOVA with type of thought (neutral, positive, negative, none) as a within participants factor and condition (undirected, directed-positive, directed-negative) as a between participants factor. All analyses were followed up with one-way ANOVAs for each specific thought type.

As anticipated, there was a significant interaction between condition and thought type (F(6, 162) = 21.56, p < .001). A significant one-way ANOVA on positive thoughts (F(2, 54) = 35.32, p < .001) revealed those in the undirected condition (M = 1.80, SD = 1.00) and directed-positive condition (M = 2.16, SD = 1.01) listed more positive thoughts than those in the directed-negative condition (M = 0.0, SD = 0.0). There was also a significant one-way ANOVA on negative thoughts (F (2, 54) = 5.77, p = .005) such that those in the directed-negative condition (M = .56, SD = .78) listed more negative thoughts than those in the undirected (M = .20, SD = .41) or directed-positive condition (M = 0.0, SD = 0.0). There was no effect on the number of neutral thoughts listed (F(2, 54) = .84, p = .44); the number of neutral thoughts listed was small across the undirected (M = .30, SD = .57), directed-positive (M = .11, SD = .32), and directed-negative (M = .17, SD = .51) conditions. Finally, there was a significant one-way ANOVA on the number of “none” responses (F (2, 54) = 20.49, p < .001), indicating participants in the directed-
negative condition provided more none responses ($M = 2.28, SD = 1.02$) than those in the undirected ($M = .70, SD = .73$) and directed-positive conditions ($M = .74, SD = .81$).

These findings confirm the manipulation of type of thinking was successful as participants in the directed-negative condition clearly made an effort to consider the drawbacks, but also that these individuals were largely unsuccessful in their efforts.

**Attitudes**

There was a significant effect of condition on attitudes, $F(3, 73) = 18.78, p < .001$. Relative to the control group ($M = 5.09, SD = 1.38$), participants who received the advertisement for the product had more favorable attitudes toward the product whether their thinking was undirected ($M = 7.68, SD = 1.16; t(38) = 6.42, p < .001$), directed towards generating negative thoughts ($M = 7.67, SD = 1.14; t(36) = 6.25, p < .001$), or directed towards generating positive thoughts ($M = 7.28, SD = 1.37; t(37) = 4.97, p < .001$). An omnibus ANOVA revealed that attitudes in the treatment conditions did not differ from one another, $F(2, 54) = .65, p = .53$.

**Attitude Certainty**

There was a significant effect of condition on attitude certainty, $F(2, 54) = 4.51, p = .02$, see Figure 2. Individuals instructed to focus on their negative thoughts ($M = 7.64, SD = 1.20$) were more certain of their attitudes than individuals who were instructed to focus on their thoughts ($M = 6.72, SD = 1.20; t(36) = 2.35, p = .02$) or positive thoughts.
Individuals instructed to focus on their thoughts or positive thoughts showed equivalent certainty, \( t(37) = .57, p = .57 \).4

Discussion

Experiment 1 examined the impact of directed-negative thinking versus undirected and directed-positive thinking. As planned, type of thinking did not influence participants’ attitudes. Thus, based on the attitude measure alone, it would appear that forming an attitude, based on a compelling message, is the same regardless of whether thinking is directed-negative, directed-positive, or undirected. However, inspection of the certainty with which people held these equivalent attitudes tells a very different story. Individuals were more confident of their attitudes when they had been directed to examining potential negatives contained in the message than when they were directed to find potential positives or undirected in their thinking. The inclusion of the directed-positive condition also suggests that it is not directed thinking per se that enhances attitude certainty, but rather it was specifically focusing on finding fault in the message, provided arguments are strong, that increased certainty in one’s new attitude. Taken together, the findings of Experiment 1 provide initial support for the metacognitive framework proposed.

One might wonder whether the effects observed in Experiment 1 are simply a result of psychological reactance. Reactance theory (Brehm, 1966, 1972) suggests that when individuals feel their personal freedom is threatened, they act in a manner to restore

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4 The control group is not included in the attitude certainty analyses because the experimental and control groups had attitudes differing in extremity. This analysis is focused on attitude certainty of similar attitudes, and therefore certainty in the control group \((M = 4.33, SD = 2.36)\) is not pertinent. Nevertheless, it is not surprising that individuals who received information about the product were more certain of their attitudes toward that product than those who were unfamiliar with the product (i.e., control participants).
that freedom. One might interpret instructing participants to consider only their negative thoughts as attacking their personal freedom by providing them with a narrow set of options. To the extent that reactance was invoked, individuals might actually adopt the goal to accept the message. Although no research has tested the impact of reactance on attitude certainty, it is possible that expressing more conviction about one's attitude is one means of saying “you want me to reject the message, but instead I will be extra confident that the position you want me to reject is right!” If so, reactance might have accounted for the results of the initial study.

The reactance interpretation of the results seems unlikely for at least two reasons. First, although participants in the directed-positive condition also had their options narrowed, if directed-thinking was viewed as limiting people’s options, it would presumably have made people want to reject the message or express less certainty in the position advocated. However, directed-positive thinking led to equivalent levels of attitude certainty as undirected thinking. Thus, directed-thinking in general would not seem to produce reactance.

Second, results from an additional experiment carried out suggest reactance is not occurring specifically in the directed-negative thinking conditions either. In this experiment, 104 Ohio State University undergraduates participated in an experiment similar to Experiment 1 with one additional condition. Specifically, a condition was added where participants were forced to find fault. That is, rather than explicitly telling participants that they could type “none” and could skip the thought listing task if they found nothing wrong, participants were told they were required to find something wrong with the message. This condition essentially restricted individuals’ freedom even more,
which should lead to even greater certainty if reactance explained the enhanced certainty found in Experiment 1. Replicating Experiment 1, there were no differences in attitudes between those undirected and directed-negative (but not required to find fault; \( t(50) = 1.67, p = .10 \)), but those in the directed-negative condition reported greater certainty \( (t(50) = 3.35, p < .005) \).

However, in contrast to reactance, individuals who were required to find something wrong showed more negative attitudes compared to those in the directed-negative (but not required to find fault; \( t(50) = 2.45, p = .02 \)) and the undirected conditions \( (t(50) = 4.31, p < .001) \). Furthermore, attitude certainty was significantly lower in the group required to finding fault compared to the other conditions \( (p < .05) \). This pattern of results renders the reactance interpretation of the certainty findings unlikely. That is, when participants were required to list negative thoughts and not given an explicit option to fail or stop, they showed more negative attitudes. If requiring negative thoughts induced reactance, this group should have shown the most favorable attitudes and/or the most certainty, but they clearly did not.
CHAPTER 3

EXPERIMENT 2

Although Experiment 1 clearly demonstrated that directed-negative thinking produced attitudes held with greater certainty relative to undirected thinking and directed-positive thinking, the generalizability of this finding remains unclear. The previous experiment used a topic for which participants were generally neutral. It remains to be seen whether the same effect would hold for a counterattitudinal topic where attitudes are initially negative. For instance, a counterattitudinal topic might invariably lead to less agreement when individuals are instructed to generate negative thoughts. In addition, the aspirin topic used was not one of particular relevance or importance to participants. Thus, an important question to examine is whether the effects would hold for an issue that people felt was personally relevant and involving (Petty & Cacioppo, 1979). To address these issues, Experiment 2 used a counterattitudinal attitude topic (implementation of senior comprehensive exams), to examine whether the findings generalize to a new topic and one counterattitudinal in nature. Furthermore, personal relevance of the issue was systematically varied to examine whether the effects are confined to issues of low relevance or importance.
Experiment 2 also included measures to assess elaboration, or amount of thinking. Past research has demonstrated that higher elaboration is associated with stronger attitudes (see Petty, Haugtvedt, & Smith, 1995). Thus, it could be that directed-negative thinking may entail more effort in general. To test this possibility, measures were included to assess the amount of thinking participants reported doing in the various conditions. Finally, Experiment 2 did not include a directed-positive thinking condition as this was shown to function similarly to the undirected thinking condition in Experiment 1.

Method

Participants

One hundred and six Ohio State University undergraduates served as participants in return for partial fulfillment of a requirement in an introductory psychology course. Participants were randomly assigned to the conditions of a 2 (Issue relevance: low, high) x 3 (Instruction set: control, undirected thinking, directed-negative thinking) between participants factorial design.

Procedure

Participants were informed that they would provide their attitudes and opinions on a campus issue. All participants then received information about a proposal to implement senior comprehensive exams at the Ohio State University. In essence, participants were told that a policy of senior comprehensive exams would require seniors to take and pass an exam in their major area before they could graduate. After receiving the information about the exams, participants in the experimental groups were told they would be receiving the message arguments and were instructed to focus on either their thoughts or
negative thoughts, and then were given a very strong message in favor of instituting the exams (see Appendix B). Participants in the control group received no additional information about the exams. All participants then completed measures to assess their attitudes, attitude certainty, and behavioral intentions. Items to measure elaboration and the perceived relevance of the issue were also included.

Independent Variables

Thought instruction. Participants were told to focus on and list either thoughts or negative thoughts towards the senior comprehensive exam policy. However, rather than having participants explicitly type “none” if they had no thoughts as in previous studies, participants were simply told they could skip the thought listing if they did not have the requested thoughts.5

Relevance. In the low relevance conditions, participants were told that the senior comprehensive exam policy was proposed to be implemented in 10 years. In the high relevance conditions, participants were told that the senior comprehensive exam policy was proposed to be implemented in 2 years. This manipulation has been used in numerous prior studies (e.g., Petty & Cacioppo, 1979; see Petty, Cacioppo, & Haugtvedt, 1992, for a review).

Dependent Variables

Thoughts. As in Experiment 1, thoughts were coded as positive, negative, neutral, or absent with respect to the advocated position.

5 This slight procedural change was made to rule out the possibility that having participants’ type “none” overly cued them to the lack of negative thoughts. Consequently, telling them simply to skip the thought listing helps increase the generalizability of the present findings while still making it clear they were not required to find fault.
Attitudes. Attitudes toward senior comprehensive exams consisted of an aggregate measure that used the same attitude items as in Experiment 1 ($\alpha = .98$).

Attitude certainty. Attitude certainty was assessed by asking participants, “How certain are you of your attitude toward senior comprehensive exams?” and “How convinced are you of your attitude toward senior comprehensive exams?” Both items were completed on 9-point scales, with 1 = “not at all” and 9 = “extremely,” and combined to form a single index ($\alpha = .73$).

Elaboration. To assess elaboration, participants were asked how much they thought about the message, how much attention they gave to the message, and how deeply they thought about the message. These items and variants of these items have been found to be sensitive to elaboration in past research (e.g., Tormala, Petty, & Briñol, 2002). Each item was assessed on a 9-point scale, and the items were aggregated to form a composite measure ($\alpha = .86$).

Relevance. Relevance was assessed by asking participants, “How personally involved did you feel with the topic you read about?” Participants responded on a 9-point scale anchored at 1 = Not at all, 9 = Very much.

Results

Relevance

There was a main effect of the relevance manipulation such that participants reported the exams as more relevant to them in the high relevance ($M = 7.27, SD = 2.17$) compared to the low relevance conditions ($M = 5.29, SD = 2.41$), $t(104) = 4.39, p < .001$.

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6 In experiment 1, this measure had asked how certain participants were of their feelings toward the attitude object, but I replaced feelings with attitude to more directly tap the variable of interest.
Elaboration

There were no main effects or interactions for elaboration (all p’s > .26). In fact, individuals reported high levels of elaboration regardless of whether they were in the low relevance ($M = 7.21, SD = 1.54$) or high relevance ($M = 7.02, SD = 1.46$) condition. Likewise, individuals reported relatively high levels of elaboration regardless of whether they were undirected in their thinking ($M = 6.94, SD = 1.68$) or directed to generate negative thoughts ($M = 7.30, SD = 1.30$). In prior work where a manipulation of relevance affected the extent of elaboration (e.g., Petty & Cacioppo, 1979), no instructions were given to participants about generating thoughts so they had to determine on their own how much to think. In contrast, in the current research it was desirable for all participants to engage in the same high level of elaboration and to vary perceived personal relevance independent of the extent of thinking. Instructing the participants to generate thoughts (or negative thoughts) accomplished this comparable level of thinking across all groups.

Thoughts

Thoughts were analyzed using a mixed ANOVA with type of thought (Neutral, Positive, Negative, Absent) as a within participants factor and thinking condition (undirected, directed-negative) and relevance (low, high) as between participants factor. As in Experiment 1, analyses were followed up with one-way ANOVA for each specific thought type.

There was a significant thought type X thinking condition interaction ($F (3, 198) = 26.03, p < .001$). Participants in the undirected condition listed more positive thoughts ($M = 1.12, SD = .82$) compared to those in the directed negative condition ($M = 0.00, SD$
Although not significant ($F(1, 66) = 2.73, p = .10$), participants in the directed-negative condition tended to list more negative thoughts ($M = .57, SD = .78$) than those in the undirected condition ($M = .30, SD = .53$). Participants in the undirected condition also tended to list slightly more neutral thoughts ($M = .12, SD = .42$) compared to those in the directed-negative condition ($M = .03, SD = .17; F(1, 66) = 1.48, p = .23$). Finally, the number of times of participants simply left the thought listing blank was significantly greater in the directed-negative ($1.40, SD = .82$) compared to the undirected condition ($M = .45, SD = .71; F(1, 66) = 25.97, p < .001$). As in Experiment 1, this confirmed that participants were generally focusing on generating the type of thoughts they were instructed to list.

There was also a significant thought type X relevance interaction ($F(3, 198) = 2.79, p < .05$). Participants in the high relevance condition tended to list more negative thoughts ($M = .72, SD = .80$) than those in the low relevance condition ($M = .23, SD = .48; F(1, 66) = 10.00, p < .005$). There were no other significant differences in the thought type between the low and high relevance conditions ($p$’s > .10).

**Attitudes**

There was a main effect of relevance on attitudes such that individuals were more negative towards the comprehensive exam proposal when it was high in relevance ($M = 4.31, SD = 2.16$) compared to when it was of low relevance ($M = 5.69 SD = 2.10$), $F(1, 100) = 8.36, p < .005$. There was also a significant main effect of instruction set, $F(2, 100) = 9.93, p < .001$, such that relative to the control groups ($M = 3.72, SD = 2.23$) individuals who received a message had more favorable attitudes whether they attempted to generate thoughts ($M = 5.76 SD = 1.85$), or negative thoughts ($M = 5.87, SD = 2.64$),
but these latter two groups did not differ from one another ($F(1, 64) = .04, p = .84$).

Means for specific cells are displayed in Table 1. There was no interaction between relevance and instruction set, $F(2, 100) = .06, p = .95$. Thus, although individuals in the high relevance conditions were more opposed to the exams overall, the effect of directed-negative thinking was similar in high and low relevance conditions in that participants instructed to consider the negatives showed the same extent of favorability toward the issue (relative to the control condition) as the instructed thought group.

**Attitude Certainty**

There was a single main effect such that individuals were more certain of their attitudes when they had been directed to consider their negative thoughts towards the message ($M = 7.29, SD = 1.27$) than when they were undirected in their thinking ($M = 6.18, SD = 1.51$), $F(1, 64) = 11.23, p = .001$. There was no main effect for relevance, $F(1, 64) = 1.73, p = .19$, nor was there any interaction between thought instruction and relevance, $F(1, 64) = .50, p = .48$, indicating the difference in certainty was unaffected by level of personal relevance.\(^7\)

**Discussion**

Experiment 2 makes multiple contributions to our understanding of processing strategies involving directed-negative thinking versus undirected thinking. First, the basic effect obtained in Experiment 1 was replicated for a new message topic, senior comprehensive exams, which was also counterattitudinal to participants – especially in

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\(^7\) The certainty effect held for each relevance condition even when the data were not collapsed. When relevance was high, individuals were more certain in the directed-negative condition ($M = 7.17, SD = 1.48$) compared to the undirected condition ($M = 5.79, SD = 1.24$), $t(27) = 2.71, p = .01$. Likewise, when relevance was low, individuals were more certain in the directed-negative condition ($M = 7.38, SD = 1.11$) compared to the undirected condition ($M = 6.47, SD = 1.65$), $t(37) = 2.01, p = .05$. 

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the high relevance version. Thus, the results of Experiment 1 can be generalized beyond a neutral topic, an uninvolving topic, and beyond the consumer domain. Although increasing personal relevance influenced the number of negative thoughts generated, and these individuals were less favorable toward the proposal than were individuals in the low relevance conditions, it was still the case that less than half of their thoughts to the message were negative and the message was still strong enough to produce more favorable attitudes than the no message control. Furthermore, attitudes were held with greater certainty when participants had been explicitly instructed to generate negative thoughts than when they processed the same high relevance message and showed the same amount of attitude change under mere thought instructions. Thus, these results suggest that relevance per se does not moderate the effect, at least in a situation in which the message arguments are very strong and the message is not so counterattitudinal or important that people will employ any means to reject it (e.g., source derogation, emotional reactions; see Zuwerink & Devine, 1996). Furthermore, elaboration did not differ as a function of condition, suggesting that the enhanced certainty effects are not the result of differential elaboration.

Finally, the present research rules against a ceiling effect interpretation of the results. That is, one might interpret the lack of changes in extremity in Experiment 1 due to there being very little room left for participants to become more positive. However, in the present study participants’ evaluations were close to the midpoint of the scale, allowing considerable room to become more positive. Consequently, the present experiment suggests the increase in certainty is not a spillover from an undetectable increase in extremity.
CHAPTER 4

EXPERIMENT 3

Having demonstrated, across two topics, directed-negative thinking led to attitudes held with greater certainty when the arguments were very strong, Experiment 3 focused on understanding the mechanism behind the enhanced attitude certainty effect. That is, why does considering one’s negative thoughts lead to greater attitude certainty than undirected thinking? Earlier it was hypothesized that the mechanism has to do with individuals’ metacognitions related to their perception of knowledge. In particular, when individuals focus on considering the negatives of an extremely strong message, not only are they aware of the positives, but they are also aware they have considered and found there are few negatives. Thus, the fact individuals have considered both the positives and the negatives of the message should be reflected primarily in participants’ perceptions of the number of negative thoughts they have. Because they found few negative thoughts, they should be more inclined to realize that the overall number of negative thoughts that must exist about the message are low.

Of course, there are other potential explanations worthy of consideration. Two areas of research, in particular, point to other antecedents of greater attitude certainty. Specifically, a substantive body of research has suggested that attitudes formed under
high degrees of thinking or elaboration are associated with greater strength (Petty, Haugtvedt, and Smith, 1995). Given certainty is one manifestation of strength, it seemed possible that, despite efforts to hold elaboration constant, there might be potential differences. However, Experiment 2 found no differences in self-reported elaboration as a function of thought instruction set. Although self-reported elaboration has been found to function consistent with actual elaboration (e.g., Tormala, et al., 2002), to further rule out the possibility of differential elaboration, an additional experiment examined whether type of thinking influenced the type or amount of thoughts participants’ listed in an open-ended thought listing. In this study, 75 participants were randomly assigned to either focus on their thoughts or negative thoughts while reading a message for a detergent. After participants read about the product, participants’ attitudes and attitude certainty were assessed. Following the completion of these measures, participants completed an open-ended thought listing where they were told to list all thoughts they had, regardless of the type of thought they were told to focus on. As in prior studies, attitudes were equivalent regardless of thought instruction \( (F(1, 73) = .20, p = .66) \), but attitude certainty was greater for those in the directed-negative thinking condition \( (F(1, 73) = 6.94, p = .01) \). Equally important, there was no difference in the valence of thoughts generated or the total number of thoughts generated in the open-ended thought listing (all \( p \)’s > .40).

Taken together, both subjective and objective assessments indicate fairly high levels of elaboration in all experimental conditions, rendering this alternative interpretation unlikely.

A second alternative explanation has to do with the subjective *ease* of generating various types of thoughts. Past research has shown individuals hold their attitudes with
greater certainty when they perceive it was easy to generate thoughts in favor of their attitudes and difficult to generate thoughts against their attitudes (e.g., Haddock, Rothman, & Schwarz, 1996; Haddock, Rothman, Reber, & Schwarz, 1998; Schwarz, Bless, Strack, Klumpp, Rittenauer-Schatka, & Simons, 1991). In one relevant study, Haddock et al. (1996) instructed participants to generate either 3 or 7 favorable or unfavorable thoughts in response to a position they supported. When instructed to generate favorable thoughts, participants were more certain of their attitudes when asked to generate 3 versus 7 favorable thoughts. However, when instructed to generate thoughts against their attitudes, participants’ were more certain of their attitudes when asked to generate 7 versus 3 unfavorable thoughts. These findings can be explained by the perceived ease or difficulty associated with the task. On the one hand, generating 3 favorable thoughts is easier than 7, and this ease may translate into enhanced certainty in an individual’s attitude (i.e., “It was easy to generate thoughts in favor of my attitude, so my attitude must be right!”). On the other hand, generating 7 unfavorable thoughts is more difficult than 3, and this difficulty can translate into greater certainty that an individual’s initial attitude is correct (i.e., “It was difficult to generate thoughts against my attitude, so it must be right!”). These effects might further be explained by the fact that people would be more confident in their thoughts in favor of their attitudes when they were easy rather than difficult to generate, and less confident in their thoughts against their attitudes when they were difficult rather than easy to generate (Tormala et al., 2002).

Subjective ease might explain the results of the present study in the following manner. Individuals in the directed-negative condition might perceive that generating
negative thoughts is more difficult than individuals who did not make a deliberate attempt to generate negative thoughts (i.e., individuals undirected or directed-positive in their thinking). Such individuals might reason that if it is so difficult to generate negative thoughts to the advocacy, then their thoughts against the advocacy must not be very good and/or that the advocacy must be good. Thus, they can be certain in their new attitudes that are consistent with the advocacy. Another alternative is that individuals who attempt to generate negative thoughts might actually infer that generating positive thoughts is easy. That is, even though they may not have put as much effort into generating positive thoughts, the experienced difficulty of generating negative thoughts could potentially lead them to infer that generating positive thoughts would be even easier than it was for individuals who actually did generate positive thoughts (i.e., individuals undirected or directed-positive in their thinking). If they infer that generating positive thoughts to the advocacy is easy, they would have confidence in these positive thoughts and infer that the advocacy must be good. If so, their attitude in support of the advocacy must be good as well. To assess the ease possibility, measures were included to assess the ease of positive and negative thought generation.

The other critical mediating mechanism tested in the following experiment is the one suggested initially – that, given strong arguments, directing one’s attention to considering the faults of a message would affect the metacognitions related to knowledge about one’s negative thoughts. It could be that it is not the ease or difficulty of generating thoughts that is salient, but the awareness one has attended to the potential negatives (i.e., the information not naturally salient). In the present research, because participants tend not to find any fault at all, attending to the negatives should be reflected
in a greater likelihood to realize there are zero or a small number of negative thoughts. When people attempt to find fault in a message but realize the number of negative thoughts they could generate is very few or none, they are able to directly draw a firm conclusion about the negative aspects and counterpoints to the message. People are able to conclude, “I considered the faults in the message but did not generate any negative reactions. Thus, in addition to the positive information, I know there are few pieces of negative information about this message.” People who accept the message largely because of the presence of positive thoughts have not explicitly considered potential drawbacks. Thus, as mentioned earlier, only individuals who had considered their negative thoughts would be likely to make the inference that they are more knowledgeable because they recognize there are few negative aspects to the message. According to this view, it is not individuals’ subjective ease in generating negative thoughts that determines certainty, but rather it is individuals’ perceptions of the extent to which they have considered the negative aspects of the message, assessed via awareness of the lack of perceived negative thoughts. Alternatively both subjective ease and awareness of having considering the potential negatives may be partly responsible for the differences in certainty.

To examine these possibilities, in Experiment 3 participants’ own perceptions of how many negative thoughts they had about the attitude object were assessed. Furthermore, participants’ perception of the number of positive thoughts they had about the attitude object was also measured. The inclusion of this measure is crucial for two reasons. First, including this measure helps rule against a demand interpretation of any mediation. That is, one might argue if participants report being certain of a positive
attitude then they may feel compelled to indicate there are fewer negatives and more positives compared to someone who is less certain. Put differently, the perceived thought measures might be viewed as proxies for attitude certainty. However, if these are distinct constructs, and are not being influenced by demand, then only the perceived negative thoughts should vary as a function of condition. Perceived positive thoughts, given positive thoughts are naturally salient, should be equivalent across conditions.

Finally, Experiment 1 and 2 used novel topics—topics for which people had to form an initial attitude. It could be that the effects are confined to situations of attitude formation. Thus, it seemed important to examine these effects for an issue for which people held some prior attitude. To address this issue, Experiment 3 used a known message topic, recognized by over 92% of participants in pilot testing, Cheer laundry detergent. The use of a well-known consumer product would demonstrate that the consequences of this effect hold even for a domain in which participants have some prior knowledge, and a prior attitude. Furthermore, actual advertising content adapted from Cheer’s products and website was used as the message stimuli, which allows for a more convincing demonstration that individuals can encounter strong messages in real life that elicit few negative thoughts, even when attempting to generate negative thoughts.

Method

Participants

Participants were 133 Ohio State University undergraduates who participated in exchange for partial fulfillment of a requirement in an introductory psychology course. Participants were randomly assigned to control, undirected thinking, and directed-negative thinking conditions. A directed-positive condition was not included because this
was conceptually predicted to be the same as the undirected condition, and shown to be the same empirically in Experiment 1.

Procedure

Participants in the experimental conditions were given an advertisement for a known product, Cheer laundry detergent, based on arguments used on Cheer’s website and advertising campaigns (see Appendix C). Participants were instructed to list either thoughts or negative thoughts. Furthermore, if participants did not have the requested thoughts, they were instructed simply not to list anything and to continue as in Experiment 2. Finally, this time, in addition to measuring certainty, measures to assess the potential mediators of interest were included (see Appendix C).

Dependent Variables

Thoughts (Actual). Participants’ thoughts were coded as in previous experiments.

Attitudes. Attitudes were measured using the items from previous experiments ($\alpha = .97$).

Attitude certainty. Attitude certainty was assessed by asking participants, “How certain are you of your attitude toward Cheer?” and “How convinced are you of your attitude toward Cheer?” Both items were completed on 9-point scales, with 1 = “not at all” and 9 = “extremely,” and combined to form a single index ($\alpha = .87$).

Subjective ease. To assess participants’ subjective ease associated with generating negative thoughts and positive thoughts, participants were asked “How difficult was it to generate negative thoughts in response to this message?” and, “How difficult was it to generate positive thoughts in response to this message?” These
measures were adapted from those used with success in previous research on ease effects (see Haddock et al., 1998; Tormala et al., 2002).

Perceived thoughts. Participants’ perceptions of how many negative thoughts they had were assessed by asking the following questions: “How many negative thoughts do you have toward Cheer?”; “What is the number of negative thoughts you have toward Cheer?”; and “How many negative thoughts could you generate toward Cheer?” (α = .86). Participants’ perceived positive thoughts were assessed using the same three items, but the word “negative” was replaced with the word “positive” (α = .82). All scales consisted of 9-points and were anchored at 1 = no negative (positive) thoughts and 9 = many negative (positive) thoughts.

Results

Thoughts (Actual)

Thoughts were analyzed using a mixed ANOVA with type of thought (Neutral, Positive, Negative, Absent) as a within participants factor and condition (undirected, directed-negative) as a between participants factor. Analyses were followed up with one-way ANOVA for each specific thought type.

There was a significant thought type X condition interaction (F (3, 258) = 56.61, p < .001). Participants in the undirected condition listed more positive thoughts (M = 1.44, SD = 1.12) compared to those in the directed negative condition (M = 0.00, SD = 0.00; F (1, 86) = 74.73, p < .001). Although not significant (F (1, 86) = 1.37, p = .25), participants in the directed-negative condition tended to list more negative thoughts (M = .24, SD = .61) than those in the undirected condition (M = .12, SD = .39). Participants in the undirected condition also tended to list slightly more neutral thoughts (M = .19, SD = .38).
.45) compared to those in the directed-negative condition (M = .02, SD = .15; F(1, 86) = 5.35, p < .05). Finally, the number of times of participants simply left the thought listing blank was significantly greater in the directed-negative (M = 2.73, SD = .65) compared to the undirected (M = 1.26, SD = .98; F(1, 86) = 69.99, p < .001) condition. As in previous experiments, this confirmed that participants were generally focusing on generating the type of thoughts they were instructed to list.

**Attitudes**

There was a significant effect of condition on attitudes, F(2, 130) = 17.88, p < .001. Compared to the control group (M = 5.91, SD = 1.73), participants who received the advertisement for the product had more favorable attitudes toward the product than no message controls, whether they were undirected in their thinking (M = 7.20, SD = 1.24), t(86) = 4.0, p < .001, or directed to generate negative thoughts (M = 7.61 SD = 1.17), t(88) = 5.45, p < .001. The attitudes of participants in the treatment conditions did not differ, t(86) = 1.58, p = .12.

**Attitude Certainty**

Individuals directed to focus on their negative thoughts were more confident in their new attitudes (M = 7.56, SD = 1.24) than individuals who were undirected in their thinking (M = 7.00, SD = 1.43), t(86) = 1.95, p = .05. Participants in the control condition reported a moderate degree of certainty (M = 6.30, SD = 2.02), likely due to their familiarity with the product.

**Mediational Analyses**

Mediation was tested using a series of regression analyses following the logic outlined by Baron and Kenny (1986). Specifically, for successful mediation to be
present, statistical analyses must first reveal a direct effect of the independent variable on the proposed mediator (Baron & Kenny, 1986). Therefore, the direct effect for each proposed mediator was examined.

**Subjective ease.** There were no effects of thought instruction on how easy participants perceived it to be to generate negative thoughts, $\beta = .02, p = .86$, or positive thoughts, $\beta = -.09, p = .43$. However, consistent with past research on ease of retrieval effects (Haddock et al., 1996, 1998), collapsed across the thought instruction conditions, the more difficult participants reported the generation of negative thoughts to be, the more certain they were of their attitudes, $\beta = .24, p = .03$. Likewise, the easier participants reported the generation of positive thoughts to be, the more certain they were of their attitudes, $\beta = -.55, p < .001$. These results suggest the measures of perceived ease appropriately assessed ease as the results of past research were replicated. However, these results also suggest that perceived ease was not a salient consequence of the type of processing manipulation (i.e., directed-negative versus undirected thoughts) and could not contribute to the certainty effects that resulted from this manipulation.

**Perceived thoughts.** There was no effect of instruction set on individuals’ perceptions of the number of positive thoughts they had, $\beta = .15, p = .17$. There was, however, a significant effect of instruction set on individuals’ perceptions of the number of negative thoughts they had, $\beta = -.25, p = .02$. Individuals instructed to focus on their negative thoughts believed that they had fewer negative reactions to the product ($M = 1.72, SD = .89$) than individuals uninstructed in their thinking ($M = 2.32, SD = 1.39$).

Having demonstrated that the manipulation influenced perceived negative thoughts, the remainder of the criterion set forth by Baron and Kenny (1986) were
followed to establish mediation. Specifically, the proposed mediator should be correlated with the dependent variable after controlling for the independent variable, and the effect of the independent variable on the dependent should drop significantly when the mediator is included in a simultaneous regression. As can be seen in Figure 3, this set of criteria is met. When perceived number of negative thoughts was included in the model, the relationship between the independent variable and the dependent variable was no longer significant, $\beta = .12, p = .25$, but the relationship between perceived negative thoughts and certainty was, $\beta = -.33, p < .01$. A formal test of mediation consisting of computing a 95% confidence interval around the indirect effect (i.e., the path through the mediator) also revealed that the indirect effect was significantly different from zero (95% CI = .02 to .57; see Shrout and Bolger, 2002).

Together, these analyses suggest the observed difference in certainty can be attributed to differences in perceived knowledge centering on an awareness regarding the potential negatives associated with the message position. Trying to generate negative thoughts and failing leads people to be more aware they have considered the potential negatives, and thus they are more likely to realize there are few potential drawbacks associated with the message advocacy. Being aware not only of the positives, but the potential negatives, increases certainty in their new attitudes. This same perception is less likely to occur to individuals who merely engage in thinking, who tend to fixate only on the positives, and thus such individuals are not as confident in their new attitudes. Importantly, it is the perception of individuals’ negative thoughts rather than their actual negative thoughts. Participants’ actual negative thoughts did not differ as a function of instruction set and therefore could not account for the differences in certainty.
Discussion

Although it seemed plausible that directing one’s attention to consider the faults of a message could be associated with greater subjective difficulty in generating negative thoughts than merely thinking, this was not found to be the case. Thus, subjective ease was not a likely mediator of the attitude certainty effect observed. This might have occurred because participants in the uninstructed thinking condition also assumed it would be difficult to counterargue, or individuals in the directed-negative thought condition were focused more on their knowledge of the absence of negative thoughts rather than on how difficult it was to generate them. In either case, subjective ease/difficulty was not responsible for the observed certainty effects. Furthermore, individuals’ perceptions of the extent of their positive thoughts to the product did not differ as a function of the thinking prompt provided. Thus, even though people in the directed-negative condition did not list as many positive thoughts as those in the undirected thinking condition, they perceived that they had as many positive thoughts. This suggests that failing to generate negative thoughts leads to similar conclusions about an individual’s positive thoughts as actually generating positive thoughts. This is congruent with the logic that, given a strong message, positive information is naturally salient, regardless of thought instruction.

What did differ between participants in the experimental groups were perceptions of knowledge in the form of metacognitions about their negative thoughts available. Individuals who attempted to generate negative thoughts (but failed) perceived themselves to have fewer negative thoughts. It is important to note that it is this perception of one’s negative thoughts rather than the actual number of negative thoughts
listed, which did not differ, that mediated the relationship between thought instruction and attitude certainty. Thus, the metacognitions people have about their own negative thoughts appear to be responsible for the increased attitude certainty that follows an unsuccessful attempt to find fault in a persuasive message.

The fact that individuals’ perceived positive thoughts did not differ as a function of instruction set also helps rule out an alternative interpretation of the mediator, namely that perceived negative thoughts is simply another index of certainty being influenced by the manipulation (or by possible demand), and not the key intervening variable. Because perceptions of individuals’ positive thoughts did not differ as a function of the instruction set, this seems unlikely to be the case. If the measures of perceived thoughts were simply proxies for certainty, or participants felt compelled to respond to the measure in line with their certainty, then both perceived positive and perceived negative thoughts should have differed as a function of instruction set. However, if these measures are sensitive to the unique metacognitive information about peoples’ negative thoughts, as proposed in this dissertation, then only the perceived negative thoughts should differ as a function of instruction set, as was found in the present study. Finally, the measure of perceived negative thoughts is also not a proxy for actual negative thoughts, as the latter was not a mediator of the certainty effect. In addition, the correlation between perceived and actual negative thoughts was relatively small ($r = .29, p < .01$), providing further evidence that perceptions of negative thoughts and actual negative thoughts are distinct constructs.
CHAPTER 5

EXPERIMENT 4

Having demonstrated, across three experiments, that directed-negative thinking can increase attitude certainty, Experiment 4 turned to examine when directed-positive thinking would enhance certainty. In particular, as outlined in hypothesis 2, directed-positive thinking should increase certainty in situations where individuals do not naturally consider their positive thoughts, such as when message arguments are extremely weak or even negative. When arguments are very weak, peoples’ negative reactions should be relatively salient, but they should have incomplete information about their potential positive reactions. Consequently, focusing their thinking on the potential positives (i.e., directed-positive thinking) may lead them to realize, in addition to having many negative thoughts, they also have few positive thoughts. If true, this should lead to an increase in certainty in directed-positive thinking conditions compared to an undirected thinking condition or a directed negative condition. Furthermore, this increase in certainty should be mediated by metacognitions related to individuals’ lack of positive thoughts, rather than their negative thoughts. Individuals should think to themselves, “Not only do I know I have a lot of negative thoughts about this message, but I also know
there isn’t really anything to like about it either! Because I am informed about both the positive and the negatives, I feel relatively certain about my attitude.”

However, an argument can be made that the enhanced certainty effects may be limited to directed-negative thinking. The absence of negative thoughts may be seen as more diagnostic than the absence of positive thoughts. Research has shown that negative information is often viewed as being more diagnostic and utilized more than positive information (Crandall, 1975; Peeters & Czapinski, 1990; Skowronski & Carlston, 1989). Although this does not necessarily imply that the absence of negative information is more informative than the absence of positive information, it nevertheless raises the possibility. If true, individuals who were aware that they had many negative thoughts and few positive thoughts (e.g., directed-positive thinking to a very weak message) would not necessarily be any more certain of their attitude than those who were only aware of their negative thoughts.

Finally, it is also possible that directed-negative thinking might be accompanied by greater certainty regardless of the message. If true, this could challenge the metacognitive perspective offered in the present dissertation as directed-negative thinking might always be associated with greater certainty as opposed to when it makes information salient that is not normally salient. Consequently, another important goal was to show directed-negative thinking would not produce differences in certainty when it paralleled the default information that was salient in an undirected condition and, in fact, could yield less certainty than directed-positive thinking.

Experiment 4 examined whether directed-positive thinking enhances certainty, compared to undirected and directed-negative thinking prompts, given a message is
relatively weak as predicted by the metacognitive perspective offered in this dissertation. Specifically, participants were given a message containing specious arguments and randomly assigned to process the message in an undirected, directed-positive, or directed-negative fashion. According to the metacognitive framework proposed, individuals should be more certain of their attitudes in the directed-positive condition compared to both the undirected and directed-negative condition. However, if directed-negative thinking per se is always associated with greater certainty, attitude certainty should be greatest in the directed-negative thinking condition compared to the directed-positive condition, and possibly the undirected condition.

Method

Participants

One-hundred and twenty-eight Ohio State University undergraduates participated in the experiment in return for partial course credit. Participants were randomly assigned to undirected, directed-positive, directed-negative, or no-message control conditions.

Procedure

Upon arriving, participants were told they would be taking part in a study on consumer research. Participants were told that Columbus was a popular test market for consumer products, and that they would be providing their opinion on one new product. Participants completed the remainder of the study on the computer. Everyone was informed they would be providing their attitude toward a new aspirin, Relieve.

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8 Eight participants were removed from analyses because they failed to follow the directed-thinking instructions. For example, individuals in the directed-negative condition reported that they actually focused primarily on their positive thoughts. This left a final useable sample of 120 participants. Most of the removed participants were non-native English speakers.
Participants were then given the directed-thinking manipulation used in Experiment 1. After reading the instructions, participants were presented with a screen containing information about the product. This information highlighted slightly negative consequences of the product and thus provided very weak arguments for the product. In fact, pilot testing found that the arguments were unpersuasive (See Appendix D). For example, participants were told that the aspirin had some potential side effects and had performed poorly on the American Medical Association’s efficiency test. Following the presentation of this information, participants were presented with each argument separately and asked, depending on condition, to list a thought, positive thought, or negative thought for each piece of information. Participants were reminded that they did not have to list a thought if they did not have a genuine thought of the requested type. Finally, participants completed measures assessing their attitudes and attitude certainty.

**Dependent Variables**

*Thoughts.* Two judges, blind to the conditions from which the thoughts came, coded the thoughts as positive, negative, neutral, or absent (i.e., a none response). Interrater agreement across both experiments was above 90% and disagreements were resolved through discussion.

*Attitudes.* Attitudes were assessed using three 9-point semantic differential scales (good-bad, favorable-unfavorable, positive-negative). All scales ranged from 1 to 9 with negative descriptors anchored at 1 and positive descriptors anchored at 9. These items were collapsed to form an aggregate measure of attitudes ($\alpha = .97$).

*Attitude Certainty.* Attitude certainty was assessed with a composite of the two items used in Experiment 2 ($\alpha = .88$).
Results

Thoughts (Actual)

Thoughts were analyzed using a mixed ANOVA with condition (undirected, directed-positive, directed-negative) as a between participants factor and thought type (positive, negative, neutral, none) as a within participants factor. One-way ANOVAs were then conducted for each thought type.

There was a significant condition X thought type interaction ($F(3, 261) = 99.14, p < .001$). A one-way ANOVA indicated that participants in the directed-positive condition tended to provide more positive thoughts ($M = .70, SD = .70$) than those in the undirected ($M = .13, SD = .35$) and directed-negative conditions ($M = .03, SD = .18; F(2, 87) = 18.00, p < .001$). There was also a significant effect for negative thoughts ($F(2, 87) = 169.76, p < .001$) such that participants in the undirected ($M = 2.43, SD = .82$) and directed-negative ($M = 2.60, SD = .67$) condition listed significantly more negative thoughts than participants in the directed-positive condition ($M = 0.00, SD = .00$). There was an effect on neutral thoughts such that those in the undirected condition ($M = .27, SD = .52$) listed more neutral thoughts than those in the directed-positive ($M = .07, SD = .25$) or directed-negative ($M = .07, SD = .25$) conditions ($F(2, 87) = 169.76, p = .05$). Finally, participants reported significantly more “none” responses in the directed-positive condition ($M = 2.23, SD = .73$) compared to the undirected ($M = .17, SD = .46$) and directed-negative ($M = .30, SD = .60$) conditions ($F(2, 87) = 109.68, p < .001$). These findings are consistent with the expectation that participants instructed to consider the positives made an effort to do so, but that this effort was largely unsuccessful.
**Attitudes**

A one-way ANOVA revealed a significant effect of condition on attitudes, \( F(3, 116) = 17.81, p < .01 \). Relative to the control group \((M = 5.72, SD = 1.06)\), participants who received the advertisement for the product had less favorable attitudes toward the product whether their thinking was undirected \((M = 3.46, SD = 1.94; t(50) = 5.60, p < .01)\), directed towards listing negative thoughts \((M = 3.06, SD = 1.51; t(50) = 7.90, p < .01)\), or directed towards listing positive thoughts \((M = 3.53, SD = 1.72; t(50) = 5.93, p < .01)\). An omnibus ANOVA revealed that attitudes in the treatment conditions did not differ from one another, \( F(2, 87) = .66, p = .52 \).

**Attitude Certainty**

There was a main effect of condition on attitude certainty, \( F(2, 87) = 2.97, p < .06 \), see Figure 2. Individuals instructed to focus on their positive thoughts \((M = 7.12, SD = 1.21)\) were more certain of their attitudes than individuals who focus on either thoughts \((M = 6.30, SD = 1.78; t(58) = 208, p = .04)\) or negative thoughts \((M = 6.25, SD = 1.60; t(58) = 2.37, p = .02)\). Individuals instructed to generate thoughts and positive thoughts showed equivalent certainty, \( t(58) = .11, p = .91 \). Participants in the control condition reported low levels of certainty overall \((M = 3.32, SD = 2.24)\).

**Discussion**

The results of the fourth experiment are important in several respects. First, they provide the first evidence that directed-positive thinking can produce increased attitude certainty relative to undirected and directed-negative thinking. This rules against the notion that directed-negative thinking is always associated with greater confidence than undirected thinking or directed-positive thinking. Likewise, this experiment provides
initial evidence that there is not a negativity bias in the sense that individuals’ lack of positive thoughts does not matter.

Taken together, these results can be contrasted nicely with the results of Experiment 1-3. Those experiments used very strong arguments, and directed-negative thinking increased certainty. As demonstrated, this occurred because directed-negative thinking sensitized people to the lack of negative information, and being aware of this increased their certainty. By a similar logic, directed-positive thinking should have increased certainty because it makes people aware of the lack of positives. That is, not only are individuals aware of the negative information, but they are also aware that they have made an effort to consider the positive information; consequently they feel better informed and thus more certain. Experiment 4 provides initial support for this perspective.
Experiment 5 was designed to examine the mechanism behind the results of Experiment 4. Specifically, in juxtaposition to Experiment 3, the key difference in perceived knowledge should be reflected in participants’ perceptions of perceived positive thoughts, but not perceived negative thoughts.

Method

Participants

Participants were 58 Ohio State University undergraduates who participated in exchange for partial fulfillment of a requirement in an introductory psychology course. Participants were randomly assigned to undirected or directed-positive thinking conditions. A directed-negative thinking condition was not included since undirected and directed-negative thinking were shown to lead to equivalent levels of certainty in the previous experiment, and were predicted to be equivalent on conceptual grounds as well. In addition, a control group was not included since the same message was used as in Experiment 4, and therefore a control group offered no additional utility.
Procedure

Participants were exposed to the aspirin advertisement used in Experiment 4. However, this time measures were included to assess individuals’ metacognitions regarding their perceived thoughts.

Dependent Variables

Thoughts (Actual). Participants’ actual thoughts were assessed as in previous experiments.

Attitudes. Attitudes were measured using the items from Experiment 4 ($\alpha = .95$).

Attitude certainty. Attitude certainty was assessed with the same items as Experiment 2 ($\alpha = .77$).

Perceived thoughts. Participants’ perceptions of how many positive thoughts they had were assessed by asking the following questions: “How many positive thoughts do you have towards the product attributes of Relieve?” and “What is the magnitude of your positive thoughts and feelings toward the product attributes of Relieve?” ($\alpha = .87$). Participants’ perceived negative thoughts were assessed using the same two items, but the word “positive” was replaced with the word “negative” ($\alpha = .86$). All scales consisted of 9-points and were anchored at 1 = no positive (negative) thoughts and 9 = many positive (negative) thoughts.

Results

Thoughts (Actual)

As in prior studies, a mixed ANOVA was conducted with condition (undirected, directed-positive) being a between participants factor and thought type (positive, negative, neutral, none) as a within participants factor. Follow-up one-way ANOVAs
were performed for each thought type. There was a significant condition X thought type interaction ($F (3, 168) = 68.98, p < .001$). Participants in the directed-positive condition listed more positive thoughts ($M = .82, SD = .79$) than participants in the directed-negative condition ($M = .23, SD = .50$; $F (1, 56) = 11.93, p = .001$). Participants in the directed-positive condition also had fewer negative thoughts ($M = .00, SD = .00$) than those in the undirected condition ($M = 1.84, SD = .69$; $F (1, 56) = 192.5, p < .001$). Participants in the undirected condition listed more neutral thoughts ($M = .39, SD = .50$) than those in the directed-positive condition ($M = .04, SD = .19$; $F (1, 56) = 11.91, p = .001$). Finally, participants in the directed-positive condition provided more “none” responses ($M = 2.15, SD = .77$) compared to participants in the undirected condition ($M = .55, SD = .68$; $F (1, 56) = 71.11, p < .001$). Thus, participants directed to consider their positive reactions made an effort to do so, but their primary response was failure as seen by the number of “none” responses.

**Attitudes**

Replicating the findings of Experiment 4, attitudes did not differ as a function of whether individuals’ thinking was undirected ($M = 4.01, SD = 1.33$) or directed-positive ($M = 3.75, SD = 1.58$; $t(56) = .67, p = .50$).

**Attitude Certainty**

Individuals directed to consider their positive thoughts were more confident in their new attitudes ($M = 7.02, SD = 1.62$) than individuals who were undirected in their thinking ($M = 6.15, SD = 1.61$), $t(56) = 2.06, p = .04$. 

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Perceived Thoughts

There was no effect of the thinking prompt on individuals’ perceptions of the number of negative thoughts they had. Individuals reported perceiving themselves to have a fair amount of negative thoughts regardless of whether they were undirected \( (M = 6.11, SD = 1.54) \) or directed-positive in their thinking \( (M = 6.37, SD = 1.63, t(56) = .62, p = .54) \). There was, however, a significant effect of instructed thinking on individuals’ perceptions of the number of positive thoughts they had. Individuals reported perceiving themselves to have fewer positive thoughts when they were in the directed-positive condition \( (M = 2.89, SD = 1.54) \) compared to the undirected thinking condition \( (M = 3.76, SD = 1.53, t(56) = 2.15, p = .04) \).

Mediation Analyses

Because there were no significant differences in actual thoughts or perceived negative thoughts these variables cannot mediate the present relationship. Therefore, only perceived positive thoughts could potentially mediate the relationship. Having demonstrated the manipulation influenced the perceived number of positive thoughts individuals had, the steps proscribed by Baron and Kenny (1986) to establish mediation were followed. Specifically, the proposed mediator should be correlated with the dependent variable after controlling for the independent variable, and the effect of the independent variable on the dependent should drop significantly when the mediator is included in a simultaneous regression. As can be seen in Figure 4, this set of criteria is met. When perceived number of positive thoughts was included in the model, the relationship between thought instruction and attitude certainty was no longer significant, \( \beta = .16, p = .20 \), but the relationship between perceived positive thoughts and attitude...
certainty was, $\beta = -.36, p < .01$. A formal test of mediation consisting of computing a 95% confidence interval around the indirect effect (i.e., the path through the mediator) also revealed that the indirect effect was significantly different from zero (95% CI = .02 to .75; see Shrout and Bolger, 2002).

Together, these analyses suggest the observed difference in certainty can be attributed to perceptions regarding individuals’ positive thoughts. Specifically, these individuals are more aware they have considered both the negatives and positives as reflected by the fact, in a situation where people are unsuccessful in finding many positive thoughts, they are more likely to reach the conclusion there are few positive thoughts available. Consequently, given weak arguments, focusing on one’s positive thoughts makes individuals aware, not only do they have many negative thoughts, but that they have few positive thoughts, which in turn increases certainty in their attitudes compared to individuals undirected in their thinking.

Discussion

This experiment reinforces the notion that directed-positive thinking can enhance attitude certainty when message arguments are weak. Furthermore, this experiment provides evidence that it is individuals’ perceived number of positive thoughts that increase certainty under these conditions. This provides additional support for the theoretical framework proposed.
Thus far, Experiments 1-3 provide support for hypothesis 1, and Experiments 4 and 5 provide support for hypothesis 2. Taken together, the present studies provide converging evidence for the conceptual framework outlined in Figure 1. Being aware of both one’s positive reactions and negative reactions strengthens one’s perceptions of knowledge, which in turn increases the certainty associated with an attitude. Another means of strengthening the evidence in support of the model is to manipulate the metacognition one is knowledgeable about both sides of a message independent of how they process the message. Specifically, if the metacognitive logic is right, manipulating directly whether individuals believe they are aware of one versus both sides of a message should influence attitude certainty. For example, explicitly informing participants that both sides have been considered by someone else may lead participants to feel as if they are more knowledgeable and informed about a message position than if they are not told both sides have been considered. Such a manipulation should, in turn, lead to greater certainty when knowledge is perceived to be greater (i.e., when a message is framed as presenting both sides). To examine this possibility, and further strengthen the proposed causal chain, Experiment 6 presents participants with messages that are framed as
presenting either positive information about a product (one-sided frame) or presenting positive and negative information about a product (two-sided frame). However, in both cases exactly the same information is presented. Thus, the crucial difference is simply the perception or salience of whether one has been exposed to one or both sides of a message.

Finally, Experiment 6 examined general perceptions of knowledge. In the previous studies evidence about the specific types of thoughts individuals had access to were found to be related to increases in certainty (i.e., perceived positive or perceived negative). However, the metacognitive model proposed in this dissertation suggests that these differences in turn influence global perceptions of knowledge about the message topic. This experiment measured general perceived knowledge on the message topic to examine whether a person’s general perception of knowledge is a further intervening variable. In addition, participants’ actual thoughts and recall were assessed. According to the metacognitive mechanism, there should be no differences on these variables.

Method

Participants

Seventy-five undergraduates from Ohio State University participated in the experiment in exchange for extra credit in their psychology courses.\(^9\) Participants were randomly assigned to a one-sided frame, two-sided frame, or control conditions.

\(^9\) One participant was removed from analyses for failing to follow instructions.
Procedure

Individuals read about a portable DVD player called the *Praxis*. Individuals first received a screen that contained a picture of the portable player along with a brief description of the product and a note about its features (e.g., 9” LCD screen, rechargeable battery, and stereo speakers). This general information was held constant across both message conditions. On subsequent screens participants received three reviews of the product that were ostensibly from students who had used the product for a month. Finally, participants completed measures to assess their attitudes, attitude certainty, perceived knowledge, actual thoughts, and message recall. See Appendix E for sample materials.

Independent Variable

In the one-sided frame condition participants read feedback from three individuals who were very favorable towards the product. For example, participants read feedback from one user who said, “I really love this portable, with the jog circular pad, it makes finding any portion of the DVD movie so easy.” The remaining user feedback was also positive and commented on aspects of the product such as the size and clarity of the screen and the high quality of the battery life. In the two-sided frame condition, participants received the same positive feedback but were also told the same individual had no negative comments about the product. Thus, the actual arguments for liking the product were held constant (e.g., an easy to use jog circular pad). Participants in the control condition received no information about the product other than being told it was a new DVD player that would soon be marketed in the participants’ city.
Dependent Variables

**Attitudes.** Attitudes were assessed using three semantic differential scales (good-bad, favorable-unfavorable, positive-negative). All scales ranged from 1 to 7 with negative descriptors anchored at 1 and positive descriptors anchored at 7. These items were combined to form an aggregate measure of attitudes ($\alpha = .92$).

**Attitude certainty.** Attitude certainty was assessed with the same two items used in Experiment 5 ($\alpha = .82$).

**Perceived knowledge.** To assess participants’ perception of how knowledgeable they were about the product, participants were asked, “How much knowledge do you feel you have about the Praxis DVD player?” and “How much do you know about the Praxis DVD player?” All items were 7-point scales anchored at 1 = “Not a lot of Knowledge/Not a lot,” and 7 = “A lot of Knowledge/A lot.” These two items were combined to form an aggregate measure ($\alpha = .89$).

**Thoughts.** Participants’ were instructed to list the thoughts they had about the product. Specifically, participants were given seven boxes for listing their individual thoughts and were instructed to type one thought per box without worrying about grammar or spelling (see Cacioppo & Petty, 1981 further details). Participants’ message-relevant thoughts were coded as favorable or unfavorable by two independent coders. Interrater agreement was above 90% and disagreements were resolved via discussion. Finally, a thought index was computed by subtracting participants’ negative thoughts from their positive thoughts and dividing by the total number of message-relevant thoughts (see Petty & Cacioppo, 1986). Unlike the previous studies, where participants were directed to focus on a particular type of thought (e.g., negative), and thus...
differences in thought profiles were expected, the present experiment encouraged participants in all conditions to list any thought they had, which made a thought index more appropriate.

Recall. Participants were also asked to recall as much information as they could about the product following the thought listing.

Results

Analyses consisted of one-way ANOVAs, with follow up contrasts when appropriate.

Thoughts

Results of the one-way ANOVA on thoughts indicated there were no differences in participants’ message-relevant thoughts towards the product as a function of condition as assessed via the thought favorability index ($t(47) = .57, p = .57$). Participants’ had a positive thought index when exposed to either the one-sided ($M = .61, SD = .54$) or two-sided frame ($M = .70, SD = .53$), indicative of generally favorable thoughts across conditions. There were also no differences in participants’ total number of message-relevant thoughts ($t(47) = .79, p = .43$). Furthermore, although participants’ message-relevant thoughts were significantly correlated with their attitudes ($r = .31, p = .03$), there was not a significant difference in attitude-thought correlations between the one-sided frame ($r = .32$) and two-sided frame groups ($r = .31; z = .04, p = .97$). This also provides evidence that elaboration was equivalent across groups as numerous prior studies have shown that thought-attitude correlations are higher when attitudes are formed under high rather than low thinking conditions (e.g., Petty et al., 1983).
Recall

Participants recalled a similar amount of information regardless of whether they received the one-sided ($M = 3.73, SD = 1.49$) or two-sided frame ($M = 3.56, SD = 1.40, t(47) = .42, p = .68$).

Attitudes

There was a significant main effect of experimental condition on attitudes such that individuals who received the message had more positive attitudes than individuals in the control condition ($M = 3.80, SD = .96; F(1, 71) = 45.69, p < .001$). Simple contrasts revealed that this was true for both the one-sided ($M = 5.85, SD = .68; t(45) = 8.35, p < .001$) and two-sided framing ($M = 5.83, SD = .91; t(50) = 7.82, p < .001$), but these two conditions did not differ from one another, $t(47) = .09, p = .93$.

Attitude Certainty

An examination of the certainty with which individuals held their attitudes revealed that individuals who received the two-sided frame held their attitude with greater certainty ($M = 5.39, SD = .84$) than individuals who received the one-sided frame ($M = 4.75, SD = 1.12; t(47) = 2.28, p = .03$). Participants in the control condition, with no information about the product, reported being relatively uncertain of their attitudes ($M = 2.82, SD = 1.50$).

Perceived Knowledge

Although there were no differences in actual thought content or recall, individuals who received the two-sided frame reported feeling more knowledgeable ($M = 4.63, SD = .91$) than those who received a one-sided frame ($M = 3.93, SD = 1.21; t(47) = 2.31, p = .03$).
Mediation Analyses

To examine whether individuals’ perceived knowledge mediated the effect of message framing on certainty, a series of regression analyses was conducted. Specifically, following the recommendations of Baron and Kenny (1986), the direct effect of the independent variable on the dependent variable was shown to be significant ($\beta = .32, p = .03$). Second, the direct effect of the independent variable on the proposed mediator was also shown to be significant ($\beta = .32, p = .03$). Finally, when controlling for the proposed mediator, the direct effect was no longer significant ($\beta = .15, p = .24$), but the relationship between the mediator and the dependent variable was ($\beta = .52, p < .001$). Furthermore, a formal test of mediation (Shrout and Bolger, 2002) found zero fell outside of the confidence interval for the indirect effect, which ranged from .04 to .73, reinforcing the conclusion that participants’ perceived knowledge fully mediated the effects of message framing on certainty.

Discussion

Experiment 6 provides additional support for the present theoretical framework by directly manipulating whether participants perceive to have information about one versus both sides of a message position. Specifically, framing a message as attending to both sides, as compared to one side, led to attitudes equivalent in valence and extremity but significantly different in certainty. This occurred despite the fact the messages contained the same substantive information. Consistent with the metacognitive logic outlined earlier, participants perceived themselves to be more knowledgeable when they were informed both sides of the messages had been considered as opposed to when this was not made explicit. Furthermore, evidence for mediation via general perceptions of
knowledge was also found. Previous studies found directed-negative thinking to a strong message leads one to be aware of the positives and (lack of) negatives, whereas directed-positive thinking to a weak message leads one to be aware of the negatives and (lack of) positives. The present experiment bolsters these finding by demonstrating when the metacognition both sides have been considered is manipulated in a more direct fashion, this resulted in greater certainty as well.

It is also worth noting that in follow-up research, the effects on certainty have been replicated even with a negative piece of information present. For example, in one study 93 participants were presented with information about a new bicycle that either featured a large number of positive attributes and no negative attributes or a large number of positive attributes and one attribute tested to be negative (i.e., the lack of a water bottle). In the two-sided frame condition participants were explicitly told that both the positives and the negatives had been considered, whereas in the one-sided frame condition participants were not told anything of this sort. There were no interactions of message framing and the presence/absence of negative information on attitudes or attitude certainty (all \( p's > .51 \)). However, consistent with the results of Experiment 6 in this dissertation, although there were no differences in attitudes \( (F(1, 91) = 22.4, p = .14) \), people reported greater certainty when the fact that both sides had been considered was made salient \( (F(1, 91) = 4.03, p < .05) \). This reinforces the notion that it is truly the perceived knowledge of both sides rather than simply the absolute lack of negatives (or positives). This work provides further evidence that perceiving oneself to know about both the positives and negatives is the crucial factor in becoming more certain in one’s attitude.
CHAPTER 8

EXPERIMENT 7

Having provided convergent evidence for the theoretical framework in the previous study, Experiment 7 sought to demonstrate the consequences found due to changes in attitude certainty induced via metacognitions about knowledge are meaningful. In particular, past research suggests that one benefit of increasing the certainty associated with attitudes is that it leads to attitudes that are more predictive of behavior (Fazio & Zanna, 1978; Tormala & Petty 2002). Experiment 7 examined this issue by assessing people’s attitude and behavioral intentions in a study using procedures similar to those of Experiment 3. Furthermore, certainty was not measured. Measuring certainty might alert participants to the fact that they are more certain, and this might artificially cause them to report behavior in accordance with their attitudes. If measuring certainty is necessary to produce more consequential attitudes, the effects may have reduced utility in the real world. To address this issue, Experiment 7 examined the impact of thought instruction on the correspondence between attitudes and intentions without measuring certainty. Specifically, the same strong arguments from Experiment 3 were used and thus certainty, though unmeasured, should be greatest for the directed-
negative condition. The question is whether attitude-behavior correspondence is also
greater in this condition.

Method

Participants

One hundred and twenty three Ohio State University undergraduates served as
participants in return for extra credit in an introductory marketing course. Participants
were randomly assigned to control, undirected thinking, or directed-negative thinking
conditions.

Procedure

Participants in the experimental conditions were given the same advertisement for
Cheer that was used in Experiment 3. Participants were instructed to list either thoughts
or negative thoughts. As in Experiment 3, participants were told they could skip the
thought listing if they had no. Finally, participants’ attitudes and behavioral intentions
were assessed. Control participants were simply asked to provide their attitude toward
Cheer without receiving any message.

Dependent Variables

Thoughts. Thoughts were coded as positive, negative, neutral, or absent.

Attitude. Attitudes toward Cheer were assessed using the same attitude items
used in Experiment 3 ($\alpha = .98$).

Behavioral intentions. To assess behavioral intentions, participants were asked,
“Will you use Cheer?” and, “Will you purchase Cheer?” Both questions were answered
on 9-point scales where 1 = “Definitely will not” and 9 = “Definitely will,” and were
aggregated ($\alpha = .98$). See Appendix F for an example.
Results

Thoughts

Thoughts were analyzed using a mixed ANOVA with type of thought (Neutral, Positive, Negative, Absent) as a within participants factor and condition (undirected, directed-negative) as a between participants factor. As in previous experiments, analyses were followed up with one-way ANOVA for each specific thought type.

There was a significant thought type X condition interaction ($F(3, 243) = 65.27, p < .001$). There was a significant effect on positive thoughts ($F(1, 81) = 92.86, p < .001$) such that participants in the undirected condition listed more positive thoughts ($M = 1.56, SD = 1.05$) compared to those in the directed-negative condition ($M = 0.0, SD = 0.0$). Although not reliable ($F(1, 81) = 2.71, p = .10$), participants in the directed-negative condition tended to list slightly more negative thoughts ($M = .40, SD = .70$) than those in the directed-positive condition ($M = .17, SD = .59$). There was a significant effect on neutral thoughts ($F(1, 81) = 17.68, p < .001$) such that participants in the directed-negative condition listed less neutral thoughts ($M = .12, SD = .40$) than those in the undirected condition ($M = .71, SD = .81$). Finally, participants in the directed negative condition left the thought listing blank more often ($M = 2.48, SD = .83$) than those in the undirected condition ($M = .56, SD = .84$; $F(1, 81) = 108.96, p < .001$). As with prior studies, this helps to confirm participants were generally focusing on listing the type of thoughts they were instructed to list, but were unsuccessful in their efforts.

Attitudes

There was a significant effect of condition on attitudes, $F(2, 120) = 9.29, p < .001$. Compared to the control group ($M = 5.86, SD = 1.79$), participants who received the
advertisement for the product had more favorable attitudes toward the product whether
they were undirected in their thinking ($M = 7.23, SD = 1.09$), $t(79) = 4.15, p < .001$, or
directed to consider their negative thoughts ($M = 7.07, SD = 1.70$), $t(80) = 3.13, p = .002$.
As in prior studies, the attitudes of participants instructed to consider their negative
thoughts did not differ significantly from the attitudes of those instructed to consider their
general thoughts, $t(81) = 0.49, p = .63$.

Behavioral Intentions

Participants exhibited stronger attitude-behavioral intention correlations when
they had been directed to consider their negative thoughts ($r = .84$) than when instructed
to consider their general thoughts ($r = .60; z = 2.28, p < .05$). There was no difference in
mean behavioral intentions of participants in the undirected ($M = 6.61, SD = 1.88$) and
directed-negative ($M = 5.95, SD = 2.27$) conditions, $t(81) = 1.45, p = .16$.

Discussion

Experiment 7 demonstrated that individuals whose attitudes changed (relative to a
control group) to a strong message following directed-negative thinking showed greater
attitude-behavioral intention consistency even though certainty was neither mentioned
nor measured. This provides evidence that how people process information can have
important implications stemming from the differences in certainty. Although certainty
was not assessed in the present experiment, it is worth noting that across several other
studies that assessed certainty and attitude-behavior correspondence simultaneously,
attitude certainty, produced by directed-thinking, has been found to mediate the
enhancements in attitude-behavior correspondence (see Rucker & Petty, 2004).

In an additional study, stronger attitude-behavior correlations were also found for
weak messages when participants were directed-positive compared to undirected in their thinking. Furthermore, a study manipulating the frame of the message as in Experiment 6, also produced differential attitude behavior correspondence. Specifically, simply framing a message as having presented both sides yielded stronger attitude-behavior correlations than framing the same message as having presented one side (Rucker et al. 2005). These additional results provide converging evidence that the observed differences in certainty are meaningful and can influence behavior.
CHAPTER 9

GENERAL DISCUSSION

Across multiple experiments, consistent evidence was found in support of the theoretical framework offered on the effects of directed thinking on attitude certainty. Experiments 1-5 demonstrated that making people think in a manner different than the default makes them aware that they are informed not only of the thoughts that are naturally salient but of the other side of the issue as well. Thus, when positive information is naturally salient (Experiments 1, 2, and 3) directing participants’ attention to the potential negatives increases awareness of having considering not only the positives, but the negatives, which increases certainty. Conversely, when negative information is naturally salient (Experiments 4 and 5), directing participants’ attention to the potential positives increases awareness of having considering not only the negatives, but the positives, which increases certainty. Furthermore, converging evidence for the mechanism was offered in Experiment 6 by manipulating the proposed metacognitive mechanism in a more direct fashion. Finally, Experiment 7 found the produced differences in certainty, consistent with past work on attitude certainty, have reliable consequences for attitude-behavior correspondence.
Implications

Processing Behind Attitude Formation and Change

Taken as a whole, the present research has considerable implications for both the persuasion literature and work on metacognition more broadly. First, the present research provides new insights into the consequences that can follow the type of thinking people use to arrive at an attitude. Specifically, the present research suggests individuals do reflect on how they reached their attitude, and this reflection can have consequences for the certainty with which the attitude is held independent of valence or extremity. Furthermore, this research highlights a new type of metacognitive reasoning process involving people’s perceptions of the information they have about a message topic (i.e., perceived knowledge about both the positives and negatives) rather than any differences in actual knowledge or recall.

These findings significantly alter predictions that would have been derived from earlier research. For example, earlier this dissertation discussed a scenario in which a manager formed three equally positive evaluations of job candidates, despite processing the information about these candidates very differently based on different goals. While past research would predict that engaging in biased processing of information might influence the resulting attitude rendering it more consistent with the pre-existing bias (e.g., Lord et al., 1979; Killeya and Johnson, 1998), this prior research would not make any distinction between attitudes that were equivalent following different forms of biased processing or unbiased processing. Based on classic research in attitude change and persuasion, the fact that attitudes were equal would lead people to predict the attitudes to function in a similar manner, regardless of any initial biases that may have led people to
attend to different types of information. The present research, however, stresses the importance of attending to a person’s goals in processing the information leading to an evaluation. For example, knowing the manager initially held a negative bias against a candidate, but overcame this bias and found merit in the candidate, should yield greater certainty than evaluating the same employee in a more objective fashion or a positively biased fashion. Furthermore, as demonstrated in Experiment 7, this may be more likely to influence behavior. As a result, ironically, the employee who might most likely receive the offer is the one for whom the manager initially attempted to find fault.

More generally, the present research emphasizes the importance of better understanding how people come to acquire their attitudes. It is not enough to simply know what attitude results from message exposure; rather, the person’s goals in processing are also very important to know as well. This conclusion is congenial with work suggesting that amount of thinking is important, even when the resulting attitudes are the same (Petty et al., 1995). However, unlike that past work, the present research stresses the importance of knowing the type of thinking above and beyond the sheer amount of thinking.

*Explaining Classic Research on One-sided versus Two-sided Persuasion*

The present research can be applied to understand classic research on one-sided versus two-sided communications. Research on one-sided versus two-sided communications examined the question of whether a communicator could ever benefit from presenting information counter to his or her position. This research contrasted messages that presented information solely in favor of a communicator’s position (one-sided) with messages that noted both the arguments in favor of the advocated position
and the arguments against the position. One important finding from the original research on one-sided versus two-sided communications was that attitudes formed via presentation of two-sided messages were more persistent over time and more resistant to change than attitudes formed via one-sided communications (Hovland, Lumsdaine, and Sheffield, 1949; Lumsdaine and Janis 1953). For example, Lumsdaine and Janis exposed participants to a one-sided or two-sided message designed to influence participants’ beliefs that the likelihood that the USSR would develop an atomic bomb in five years was low. A week later, participants were exposed to a message that attempted to undermine this belief (i.e., that the USSR would have an atomic bomb within five years). Lumsdaine and Janis found that individuals were less likely to change their attitudes at time two if they had initially been given a two-sided message.

The metacognitive processes discussed in the present research may well explain the original findings on one-sided versus two-sided communications. In Experiment 6 it was demonstrated that framing a message as one or two-sided influenced the level of attitude certainty. Regarding classic work on two-sided communications, it seems plausible that individuals who received the two-sided message, even after controlling for differences in actual knowledge, may have perceived themselves to have more knowledge, which in turn would lead to greater attitude certainty as in Experiment 6. Certainty could then explain the differential resistance of these attitudes as certainty has been postulated to give rise to defensive processing (Gross et al. 1995) and to be associated with resistance (Tormala & Petty 2002). Consequently the present research might inform this classic work as well.
In fact, the present research could be used as a conceptual springboard to revisit any prior work where no differences in attitudes were found, but there were clear differences in how people reached their attitudes. In such circumstances, the process by which the attitude was formed or changed may have important implications.

*Implications for Attitude Strength*

Whereas a substantial amount of research and writing have stressed the importance of attitude strength (see Petty & Krosnick, 1995), research on *creating* strong attitudes has primarily focused on increasing the extent of issue-relevant elaboration as a means to do this (e.g., Chaiken, 1980; see Petty, et al., 1995 for a review). In this regard, the present findings are especially noteworthy as elaboration was held constant across conditions, so the present research provides an entirely new means to create stronger attitudes. As a result, the present work suggests a new way of creating stronger attitudes in participants by focusing them on the information that is normally not salient either through thinking prompts (Experiments 1-5) or through message framing (Experiment 6).

*Implications Beyond Persuasion*

The present research is likely to be of relevance for a number of paradigms outside of persuasion. For example, peoples’ impressions of others might be influenced by their metacognitive reasoning of how they came to like or dislike a particular person. For example, altering an individual to the fact they might not have seriously considered the faults of a new friend may lead them to question their attitude and evaluation of that friend. Similarly, in the judgment and decision making literature, whether a person decides to act on a particular decision may be a function of how that person perceives
him or herself to have reached that decision. For instance, a person deciding whether to perform a breast exam might reason to herself, “I know the health benefits and lack of risks of performing an exam, so I should follow-through and perform the exam.” This reasoning may lead to a greater likelihood of the woman actually performing the exam than if she were only aware of the health benefits and had not considered the lack of negatives. In short, the findings of the present research are unlikely to be limited to the realm of persuasion, and likely to have applications in a host of other domains as well.

Applications

Finally, it is worth noting that the present research offers a number of applications ranging from health communications to advertising. For example, as alluded to previously, health messages might stress the numerous benefits, and relative lack of negatives, of self-examinations for breast cancer. Similarly, advertisements for consumer goods might stress the benefits of the product as well acknowledge (minor) potential negatives. However, the present research has applications beyond simple written messages. For example, consider the domain of interpersonal selling in the context of buying a new car. Consumers looking for a new car want to purchase the product, but are trying to reach a decision on what type of car is best for them. How might a salesperson help consumers rule out alternatives or become confident once the consumer is ready to make a decision?

The present research suggests one solution to this question would be to encourage a person to aggressively consider what he or she dislikes about the car while taking the test drive. If the consumer finds a lot he or she dislikes about a car, this result would help the consumer rule out the car from selection, but if the consumer realizes there is little he
or she dislikes this should increase the certainty underlying their evaluation, which may help him or her reach a decision that is comfortable and that will result in a purchase.

Future Directions

Although the present research has found that directing participants’ attention to information that is normally not salient increases attitude certainty, it is important to note that directed-thinking should not always confer this property to attitudes. In fact as discussed earlier, past research has found that successful directed-negative thinking is typically associated with reductions in attitude change relative to more undirected processing and directed-positive thinking is associated with enhancements in attitude change (e.g., Killeya & Johnson, 1998; Petty & Cacioppo, 1979). Indeed, there are a number of likely boundary conditions of the effects as well as moderators of when different types of directed thinking will produce differences in the attitude itself (as in some prior research, Killeya & Johnson, 1998) as opposed to identical attitudes and enhanced confidence (e.g., Tormala & Petty, 2002).

Strength of Arguments

In the present research, arguments were developed to be unambiguous such that the strong arguments elicited primarily positive thoughts (Experiments 1-3) and the weak arguments elicited primarily negative thoughts (Experiments 4 and 5). In prior studies examining attitude change, arguments were labeled as “strong” if they elicited mostly favorable thoughts and few counterarguments when people were simply instructed to think about them. Conversely, arguments were labeled as “weak” if they elicited mostly unfavorable thoughts and many counterarguments when people were simply instructed to think about them (see Petty & Cacioppo, 1986, for details on argument strength

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pretesting procedures). In the current research, however, arguments were selected to be strong/weak enough so that people would be generally unsuccessful in generating negative/positive thoughts even when directed to try. It is not clear that the strong/weak arguments used in prior research would meet this criterion.

Thus, the effects reported in the present studies may only be observed when the arguments are pretested to be especially strong or weak. In fact, in initial attempts to develop the strong arguments used in Experiments 1-3, results consistently replicated the findings of Killeya & Johnson (1998) wherein people instructed to try and counterargue were able to do so and thus showed resistance to persuasion. It was only through the forging of stronger arguments that attitude change was equivalent for individuals undirected in their thinking and those instructed to focus on their negative thoughts. However, it is important to note that this super-strong type of argument is not mythical, and is still likely to be encountered in everyday life, such as the arguments used in Experiments 3 and 7 demonstrate. Nevertheless, it seems likely that the more knowledge and confidence people have in their prior attitudes, the less likely it is that one can develop veridical arguments that cannot be counterargued. Similarly, if weak arguments are not sufficiently weak, individuals may be capable of finding sufficient merit when directed to do so that their attitudes become more positive. Such circumstances may require alternative means of increasing certainty.

Level of Elaboration

One direction for future research is to examine whether the certainty effect observed in the present research is most likely to occur under levels of moderate to high elaboration as opposed to low levels of elaboration. Consistent with prior work on
metacognitive processes in persuasion (e.g., Briñol & Petty, 2003; Tormala et al., 2002), it is speculated that the observed effects are likely to occur under high levels of elaboration for several reasons. First, the metacognitive reasoning discussed relies on individuals being able to reflect upon their thought processes and produce an inference, not about the actual information they generated, but how they processed the information. If individuals were not to take the task seriously, or did not put effort into seriously considering the information that was not naturally salient, they would be unlikely to reach this metacognitive inference that they processed the message by being informed about both the potential positives and negatives.

In support of this, in a variation of Experiment 6, an experiment was conducted that measured participants’ need for cognition. NFC is an individual difference variable that measures participants’ natural tendency to engage in and enjoy thinking (Cacioppo & Petty, 1982). This experiment replicated the effects reported in Experiment 6 (i.e., more attitude certainty for two-side framed messages) but only for those participants high in need for cognition. This provides further support for the idea that the present research is examining phenomena most likely to occur under high elaboration. Of course, future research could directly manipulate elaboration to provide a stronger test of this hypothesis.

**Extremity versus Strength**

Some may wonder whether why attitudes held with greater certainty did not become more extreme, and, furthermore, whether this might be due to a ceiling effect given attitudes were generally extremely favorable (Experiments 1 and 3) or unfavorable (Experiments 4 and 5). However, recall Experiment 2 used a counterattitudinal topic, and
although attitude change occurred and equivalent for all those who received a message, attitudes were, on average, at the midpoint of the scale. Consequently, there remained plenty of room for participants to become more positive suggesting the results are unlikely to be due to a ceiling effect.

Furthermore, as pointed out earlier, although differences in extremity could potentially occur, and extremity is sometimes considered a manifestation of strength (e.g., see Abelson, 1995), prior work has generally shown increases in knowledge are more prone to have an impact on attitude certainty than on the valence or extremity of the attitude itself (Krosnick et al. 1993; Rucker et al., 2005). As discussed earlier, this likely follows from the idea that feeling one is more knowledgeable does not convey one should become more extreme in one’s position; rather, feeling more knowledgeable reinforces and signals that whatever attitudes one has already reached can be trusted (i.e., held with greater certainty).

**Additional Consequences**

Finally, one useful direction for future research would be to establish further consequences for the differences in attitude certainty found in the present research. For example, past work has shown that not only do attitudes held with greater certainty tend to exert a stronger influence on behavior (Fazio & Zanna, 1978; Tormala & Petty, 2002), but such attitudes also are more likely to be persistent over time (Bassili, 1996), and resistant to attempts to change them (Tormala & Petty, 2002). Given the effects of certainty on the attitude-behavior correspondence generalized to the present paradigm (see Experiment 7), it seems likely that certainty would have similar effects for
persistence and resistance. Nonetheless, this is an empirical question, and would be a useful direction for future research.

**Conclusion**

The present research examined the role of type of thinking for attitude certainty. In particular, it was proposed that causing participants to think in a manner that directed their attention to information that was not normally salient would lead to metacognitions tied to how informed they were about both sides of the message position (i.e., the positives and the negatives), which in turn would increase the amount of certainty associated with the attitude. In particular, the current research has demonstrated that being aware that one has considered not only the information naturally salient, but one has made an effort to consider the other side of the issue led to attitudes held with greater levels of certainty (Experiments 1-5) and more predictive of behavioral intentions (Experiment 7). Similar effects occurred if the perception of whether both sides had been considered was manipulated in a more direct manner (Experiment 6). These findings significantly extend past theory by recognizing that it is not enough to attend simply to what attitudes people reach, but it is also important to understand people’s *perceptions of how they reached their attitudes*. Acknowledging the method by which attitudes are reached provides a more complete understanding of how those attitudes might influence behavior. Indeed, by adopting a more metacognitive focus to understanding persuasion, research will be able to better understand the complex and dynamic processes involved in persuasion.
LIST OF REFERENCES


APPENDIX A

SAMPLE MATERIALS FROM EXPERIMENT 1
Task Overview

As you know, the psychology department and the Fisher School of Business collaborate on projects involving consumer research.

This study is a joint effort assessing people’s perceptions of different consumer products. The computer has randomly selected a consumer product contained in the computer’s database. You will be given some facts about the product and asked to provide your opinion of the product.

Please read all instructions that follow.

Press the Spacebar to Continue...

Opening Instructions

Product Selection

The computer has randomly selected Relieve®. Relieve® is a new brand of aspirin that will soon be marketed in Columbus.

Press the Spacebar to Continue...

Opening Instructions Screen 2
Instructions in the Undirected Thinking Condition

Task Instructions

You will be given information about a new aspirin that may be test marketed in Columbus in the upcoming year.

A common method of gauging consumers’ response to products is to assess what THoughts people have about using the products. Therefore, you will be asked to focus on and list the THoughts you have about using the aspirin you read about.

Of course, you might not have any thoughts about using the aspirin you read about. If you do not have any thoughts about the aspirin you read about, we would like you to type the word NONE in capital letters.

Press Spacebar to Continue

Instructions in the Directed-Negative Thinking Condition

Task Instructions

You will be given information about a new aspirin that may be test marketed in Columbus in the upcoming year.

A common method of gauging consumers’ response to products is to assess what NEGATIVE THOUGHTS people have about using the products. Therefore, you will be asked to focus on and list the NEGATIVE THOUGHTS you have about using the aspirin you read about.

Of course, you might not have any NEGATIVE THOUGHTS about using the aspirin you read about. If you do not have any NEGATIVE THOUGHTS about the aspirin you read about, we would like you to type the word NONE in capital letters.

Press Spacebar to Continue
Task Instructions

You will be given information about a new aspirin that may be test marketed in Columbus in the upcoming year.

A common method of gauging consumers’ response to products is to assess what POSITIVE THOUGHTS people have about using the products. Therefore, you will be asked to focus on and list the POSITIVE THOUGHTS you have about using the aspirin you read about.

Of course, you might not have any POSITIVE THOUGHTS about using the aspirin you read about. If you do not have any POSITIVE THOUGHTS about the aspirin you read about, we would like you to type the word NONE in capital letters.

Instructions in the Directed-Positive Thinking Condition

Relieve® is an enteric coated aspirin that helps alleviate headaches and protects against stomach upset and damage. It has been designed to be safer for your body, especially your stomach, than plain or buffered aspirin.

Relieve® is a multipurpose aspirin that may be used for complete relief of minor aches and pains associated with cold, headache, toothache, muscular aches, backache, minor pain from arthritis, and to reduce fever.

Relieve® aspirin caplets are easy to swallow with a special caplet shape and patented Toleraid Micro-Coating. 100% pure Relieve® aspirin is caffeine free and sodium free. It starts to work in minutes and lasts longer than other aspirins, meaning you get quick relief for a longer period than with other aspirins.

Fact from Clinical Trials: Supervised and Conducted by the American Medical Association (AMA)

* Clinically proven to work in minutes and to outlast other brands of Aspirin by 2 hours

* Received a perfect score of 10 on the American Medical Association’s efficiency test (where 1 = poor and 10 = excellent)

* Safe, does not lead to harmful side effects that can occur with other Aspirins (e.g., stomach upset and damage)

Message
"Clinically proven to work in minutes and to outlast other brands of Aspirin by 2 hours"

If you had a POSITIVE THOUGHT about this aspect of this brand of aspirin, please list it below. If you didn’t have a POSITIVE THOUGHT about this aspect of this brand of aspirin please type NONE (in capital letters).

1. 

Press ENTER after each response...

Sample Thought Listing (Directed-Positive Thinking Condition)

Please provide your attitude toward Relieve® on the following scale.

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Sample Attitude Measure
Sample Certainty Measure

How certain are you of your feelings toward Relieve®?

1. Not certain at all
2. 3. 4. 5. 6. 7. 8. 9. Extremely certain
APPENDIX B

SAMPLE MATERIALS FROM EXPERIMENT 2
Senior Comprehensive Exams

Recently, The Ohio State University has begun to consider instituting senior comprehensive exams in students' major areas. A policy of senior comprehensive exams would require seniors, prior to graduation, to take a series of exams designed to demonstrate competency in specific skills required by their particular majors.

Students majoring in Business, for example, would be required to pass a comprehensive examination in that subject area. Similarly, students majoring in Psychology would be required to pass a comprehensive psychology test prior to graduation. Students who failed this exam would be allowed to retake it anytime, but would eventually have to pass the exam to receive their degree.

Sample Intro Screen

A university committee has been organized, and has submitted a detailed proposal IN FAVOR of implementing the exams at OSU in ten years, beginning in the 2013-2014 academic year. This means all freshmen and sophomores enrolled in 2010-2011 will have to complete the exams.

Prior to implementing senior comprehensive exams, however, the university's Board of Trustees intends to gauge students' reactions.

Low Relevance Condition
A university committee has been organized, and has submitted a detailed proposal IN FAVOR of implementing the exams at OSU in two years, beginning in the 2004-2005 academic year. This means all current freshmen and sophomores will have to complete the exams.

Prior to implementing senior comprehensive exams, however, the university’s Board of Trustees intends to gauge students’ reactions. The Board takes OSU students’ opinions very seriously on matters of this kind, so please give us your careful attention in this experiment.

Proposal for Senior Comprehensive Exams

- **Increased University Standing:** Senior comprehensive exams are a sign to educators, employers, and students of integrated thinking and advanced thinking. The top ten universities in the nation have all adopted senior comprehensive exams, and the exams will soon be required for a university to receive national accreditation. Adopting the exams means that OSU will continue to be nationally accredited; will continue its tradition of excellence; and continue to attract top students, faculty, and staff.

- **Increased Federal Funding:** Universities that implement senior comprehensive exams are given additional funding by a new government program that rewards performance-based education. For OSU this means funds to renovate and improve teaching facilities. For students, this means at least a 5% tuition decrease would accompany the passing of the exam proposal. In addition to an immediate 5% tuition decrease, the government program provides funds to ensure students’ tuition will not be raised for a period of at least 5 years.
Sample Elaboration Item

To what degree did you pay attention to the arguments in the message about comprehensive exams?

1. Not at all
2
3
4
5
6
7
8
9. Very much

Personal Relevance Item

How personally involved did you feel with the topic you read about?

1. Not at all
2
3
4
5
6
7
8
9. Very much
APPENDIX C

SAMPLE MATERIALS FROM EXPERIMENT 3
Task Instructions

A common method of gauging consumers’ response to products is to assess whether or not consumers have THOUGHTS or reactions to the qualities of the product. Therefore, carefully consider whether you have any THOUGHTS about the qualities of the product you read about.

IMPORTANTLY, we only want you to report THOUGHTS if you have ones that naturally come to mind. It is equally useful for us to know if you have no THOUGHTS about the qualities of the product you read about. If you find you really have no THOUGHTS about the qualities of this product, you do not have to list any.

Press the Spacebar to Continue...

Sample Thought Instruction Screen

Mild to Skin: Cheer® is dermatologist recommended. It is free of dyes and perfumes and is mild to skin. Unlike some detergents, Cheer® is designed to be safe and harmless to your skin.

Extra cleaning power: Cheer® is designed to be a great color protector with extra strength cleaning power. Cheer® contains a non-bleach cleaning booster, which is specially formulated to brighten colors while whitening whites.

Great color protection: Cheer® helps prevent pilling of cottons and also neutralizes chlorine in your wash water to help prevent colors from fading. Some dyes bleed in the wash because of the type of dye used, but Cheer® traps those dyes preventing them from bleeding.

Message

96
Extra cleaning power. Cheer® is designed to be a great color protector with extra strength cleaning power. Cheer® contains a non-bleach cleaning booster, which is specially formulated to brighten colors while whitening whites.

If you had NEGATIVE THOUGHTS about Cheer® BASED ON THE ABOVE information please list them below. If you did not have any NEGATIVE THOUGHTS please press the ESC key.

1. [Blank]

Press ENTER after each response...

Sample Thought Listing

How many negative thoughts do you have toward Cheer®?

1  no negative thoughts
2
3
4
5
6
7
8
9  many negative thoughts

Sample Perceived Thought Item
How difficult was it to generate negative thoughts in response to this message?

1. Not at all difficult
2
3
4
5
6
7
8
9. Very difficult

Sample Ease Item
APPENDIX D

SAMPLE MATERIALS FROM EXPERIMENT 4
Relieve® Aspirin: Product Attributes

Relieve® costs 15% more than other aspirins

Relieve® received a score of 5 on the American Medical Association’s efficiency test (where 1 = poor and 10 = excellent)

Side effects associated with Relieve® are fairly minor and slightly harmful.
APPENDIX E

SAMPLE MATERIALS FROM EXPERIMENT 6
Task Instructions

- This project is interested in consumers’ thoughts about products that are accompanied by user feedback.

- We will first give you general background information about a product randomly selected from the computer’s database. Following this information you will be given user feedback from individuals who were asked to use and evaluate the product in a study last quarter. You will then be asked to provide your opinions about the product.

Opening Instructions

Product Information

Introducing the 
Praxis DVD Portable Player

DVD Type: DVD player
Number of Discs: 1
Portable: Yes

Features

The Praxis DVD player features a 9-inch diagonal wide-screen LCD monitor, a built-in recharger, stereo speakers, and a remote control.

Product Information Screen
Feedback from User #3

User Feedback and Comments

"Unlike some of the other units I shopped around for, this DVD player has the battery built into the small unit. Really a superior design."

Press the SPACEBAR to continue

Sample Feedback in One-Sided Condition

Feedback from User #3

Positive User Feedback and Comments

"Unlike some of the other units I shopped around for, this DVD player has the battery built into the small unit. Really a superior design."

Negative User Feedback and Comments

"I don’t have any."

Press the SPACEBAR to continue

Sample Feedback in Two-Sided Condition
Please provide your attitude toward the Praxis DVD player on the following scale:

1. Negative
2. 3. 4. 5. 6. 7. Positive

Sample Attitude Item

How certain are you of your attitude toward the Praxis DVD player?

1. Not certain at all
2. 3. 4. 5. 6. 7. Extremely certain

Sample Certainty Item
Sample Perceived Knowledge Item

How much do you know about the Praxis DVD player?

1. Not very much
2.  
3.  
4.  
5.  
6.  
7. A lot

Thought Listing Screen

Please use the space below to list your thoughts about the Praxis DVD player. Press the ENTER key after each thought. You may list as many thoughts as you like. When you no longer have any thoughts left to list press the "ESC" key.

1. [Thought]

Press ENTER after each response...
Please use the space below to list your AS MUCH AS YOU CAN REMEMBER about the Praxis DVD player or what USER's said about the product. Press the ENTER key after each comment you can recall. When you cannot remember anything else that was said about the product please press the "ESC" key.

1. 

Press ENTER after each response...

Recall Screen
APPENDIX F

SAMPLE MATERIALS FROM EXPERIMENT 7
Sample Behavior Item

Will you use Cheer®?

1 Definitely Will Not
2
3
4
5
6
7
8
9 Definitely Will
Figure 1: Conceptual Framework

- **Weak Arguments Present**
  - Directed Negative
  - Undirected
  - Directed Positive

- **Strong Arguments Present**
  - Negative Thoughts Salient
  - Positive Thoughts Salient
  - Positive Thoughts (Lack of) Salient
  - Negative Thoughts (Lack of) Salient

- **Increased Attitude-Behavior Correspondence**
  - Awareness of Both Positives and Negatives Increases Certainty
Figure 2: Attitude and attitude certainty results from experiments 1 and 4
Figure 3. Mediational model of certainty effects in Experiment 3. Value in parentheses indicates the direct effect of thinking prompt on attitude certainty before the mediator was included in the model. * p = .05. ** p < .05. ***p < .01.
Thinking Prompt → -0.28** → Perceived Positive Thoughts → -0.36*** → Attitude Certainty

Figure 4. Mediational model of certainty effects in Experiment 5. Value in parentheses indicates the direct effect of thinking prompt on attitude certainty before the mediator was included in the model. * p = .05. ** p < .05. *** p < .01.
<table>
<thead>
<tr>
<th>Low Relevance</th>
<th>Thoughts</th>
<th>Rating Scales</th>
<th></th>
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<tbody>
<tr>
<td></td>
<td>Negative</td>
<td>Positive</td>
<td>Neutral</td>
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<tr>
<td>Undirected (N = 19)</td>
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<td>1.26(.81)</td>
<td>.21(.54)</td>
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<td>Directed-Negative (N = 20)</td>
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<td>0.00(.00)</td>
<td>.05(.22)</td>
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<td>High Relevance</td>
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<td>Undirected (N = 14)</td>
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<tr>
<td>Directed-Negative (N = 15)</td>
<td>.93(.88)</td>
<td>.00(.00)</td>
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Table 1. Means for type of thought, attitudes, and certainty (Standard Deviations in parentheses) as a function of relevance and thought condition in Experiment 2.