Abstract

The present research examines whether the reasons that people think underlie their certainty in an attitude affect the process through which they resist persuasion. Although attitude certainty has been studied as an important indicator of an attitude’s strength, the various antecedents to certainty uncovered in past research suggest that perhaps equal degrees of certainty can vary in their bases. Following from prior work on attitude strength, such distinct routes to attitude certainty were hypothesized to have implications not for outcomes traditionally associated with strong attitudes (e.g., resistance in the face of persuasion) but for the processes used to achieve those outcomes (e.g., direct counterarguing vs. simply discounting the message). Two studies tested this hypothesis by examining the relationship between peoples’ perceived bases for attitude certainty and thoughtful (vs. nonthoughtful) engagement in resisting a persuasive message. In Study 1, perceived bases of certainty were measured using a survey methodology, and in Study 2, perceived bases of certainty were manipulated using a false feedback paradigm. In both studies, when people perceived having stronger (vs. weaker) reasons for their degree of attitude certainty, they spent more time reading a counterattitudinal message, produced more message-unfavorable thoughts in response to the message, and produced message-unfavorable thoughts characteristic of more thoughtful resistance strategies. Together, these studies provide evidence that attitude certainty can achieve the outcomes traditionally associated with strong attitudes via different processes depending on the
bases on which people perceive their certainty to rest. Implications for the
generalizability of these effects are discussed.
Acknowledgments

I would like to thank my advisor, Richard Petty, for his guidance and helpful comments at every stage of this research, from conceptualization to writing this document.

I would also like to thank Pablo Briñol for his help in developing these studies and for his useful suggestions regarding method and analysis, occasionally from thousands of miles away.

Finally, I thank the members of the Petty Lab (Ben Wagner, Brittany Shoots-Reinhard, India Johnson, Jennifer Belding, Geoffrey Durso, and Nicholas Wright) for their support and the members of the Attitudes and Persuasion Lab and the Group for Attitudes and Persuasion for their useful comments and suggestions that have made this research better.
Vita

June 2006 .................................................................Prospect High School

2010.......................................................... B.A. in Psychology, Eastern Illinois University

2010-2011 .......................................................Graduate Fellow, The Ohio State University

2011-2012 ..............................................Graduate Research Associate, The Ohio State University

Fields of Study

Major Field: Psychology
# Table of Contents

Abstract ............................................................................................................................... ii

Acknowledgments .............................................................................................................. iv

Vita ...................................................................................................................................... v

Table of Contents ............................................................................................................... vi

List of Tables .................................................................................................................... vii

Chapter 1: Introduction ...................................................................................................... 1

Chapter 2: Study 1 ............................................................................................................ 16

Chapter 3: Study 2 ............................................................................................................ 34

Chapter 4: General Discussion .......................................................................................... 51

References ......................................................................................................................... 71

Appendix A: Ratings of Strength of Reasons for Attitude Certainty ......................... 86

Appendix B: Factor Analyses of Reasons for Attitude Certainty ............................... 88

Appendix C: Manipulation of Reasons for Confidence ................................................ 91
List of Tables

Table 1. Resistance Strategies in Study 2. .......................................................... 48

Table 2. Means and Standard Deviations for Reasons for Certainty (N = 31). .......... 87

Table 3. Factor Loadings for Reasons for Certainty: Maximum Likelihood Estimation, Oblique Rotation (N = 68). ................................................................. 89
Chapter 1: Introduction

Most people have felt the sense of total conviction that can accompany a confidently held belief or opinion. Feeling that one is right is a hallmark of human thinking and has attracted the curiosity of psychologists and philosophers alike. What is unclear is whether all certainty is fundamentally the same or whether there are different underlying bases of certainty that have unique effects. Though two people may agree on some issue, and each may hold their opinions with equal certainty, their reasons underlying that sense of certainty may differ. If it is only the degree of certainty that is meaningful, individuals with different bases for their certainty would be expected to behave identically. However, might differences in how they reached that degree of certainty be consequential? This is the question that motivates the present research.

In particular, this thesis addresses the question of how the perceived bases for attitude certainty affect engagement in the persuasion resistance process. Although people who express certainty in their attitudes are unlikely to be swayed by persuasive messages, the underlying bases for that sense of certainty may have implications for exactly how they resist persuasion. To understand how the bases underlying attitude certainty might influence the process of resisting a persuasive message, it is necessary to first explore these two concepts—certainty and resistance—in greater depth. Before
presenting the studies conducted to answer the research question, a brief overview of the vast literatures on attitude certainty and resistance to persuasion will be covered.

**Attitude Certainty**

In their seminal review, Gross, Holtz, and Miller (1995) defined *attitude certainty* as “a subjective sense of conviction or validity about one’s attitude or opinion” (p. 215). An attitude is simply an overall evaluation of some target, but one’s certainty in that attitude reflects a secondary cognition about the extent to which the person perceives the evaluation as correct. Although researchers consider attitude certainty an indicator of the attitude’s “strength” (i.e., how durable and impactful the attitude is; Krosnick & Petty, 1995), certainty is conceptually and empirically distinct from other such dimensions of attitude strength like attitude extremity, attitude importance, attitude accessibility, and attitude intensity (Krosnick, Boninger, Chuang, Berent, & Carnot, 1993; Visser, Bizer, & Krosnick, 2006).

Myriad variables are associated with the certainty with which people hold attitudes. These antecedents to certainty illustrate the diversity of means by which a person can become certain or doubtful of their attitudes. One class of antecedents to certainty reflects how thoughtfully one has considered the object of evaluation. For instance, attitudes are held with relatively more certainty when a person has elaborated more on attitude-relevant information (Barden & Petty, 2008; Smith, Fabrigar, MacDougall, & Wiesenthal, 2008). Additional, though less direct evidence for this view comes from studies showing that attitudes are held with more certainty when the they are formed via direct (vs. indirect) experience with the attitude object (Fazio & Zanna, 1978; Wu & Shaffer, 1987), when the person reports relatively high amounts of knowledge
about the attitude object (Krosnick et al., 1993; Prislin, 1996), and when the person has resisted a strong counterattitudinal persuasive message (Rucker & Petty, 2004; Tormala & Petty, 2002, 2004b). In fact, one need not actually engage in more attitude-relevant thought to reach a higher degree of certainty but can instead reach this certainty simply by perceiving oneself as having engaged in more thought (Barden & Petty, 2008; Wan, Rucker, Tormala, & Clarkson, 2010).

Other variables have been found to predict attitude certainty. For example, attitudes are held with relatively greater certainty when they are more accessible as a result of mere repetition of a persuasive message (Berger & Mitchell, 1989) or attitude expression (Holland, Verplanken, & van Knippenberg, 2003; Petrocelli, Tormala, & Rucker, 2007), when the same attitude is held by the majority of others (i.e., when there is social consensus; Festinger, 1954; Orive, 1988; Petrocelli et al., 2007; Visser & Mirabile, 2004), when the attitude is relatively more important (Visser, Krosnick, & Simmons, 2003), and when the person is in a positive mood (Briñol, Petty, & Barden, 2007; Tiedens & Linton, 2001).

Several individual difference variables also predict attitude certainty, including need for cognition (e.g., Barden & Petty, 2008), need for cognitive closure (Kruglanski & Webster, 1991; Kruglanski, Webster, & Klem, 1993; Webster, 1993), and certainty orientation (Sorrentino & Short, 1986). Specifically, those higher in needs for cognition, closure, and certainty orientation tend to be more certain of their attitudes. Additionally, attitude certainty has been found to vary as a function of age such that certainty increases earlier in life (peaking at about age 40) and declines over the remainder of the life cycle (Visser & Krosnick, 1998).
Although each of these many predictors affects the degree of certainty a person has in his or her attitude, researchers show interest in attitude certainty because it has implications for the attitude’s likelihood of guiding behavior and withstanding the effects of both time and direct attempts at persuasion. Because certainty is identified as a dimension of attitude strength, attitudes held with greater certainty would be expected to demonstrate the properties characteristic of “strong attitudes”—i.e., correspondence with behavior, persistence over time, and resistance to persuasion (Krosnick & Petty, 1995). This is indeed the case. Attitudes held with higher degrees of certainty are more predictive of behavior (Berger & Mitchell, 1989; Bizer, Tormala, Rucker, & Petty, 2006; Fazio & Zanna, 1978; Glasman & Albarracin, 2006; Kraus, 1995; Rucker & Petty, 2004), more stable over time (Bassili, 1996), and more resistant in the face of persuasive messages (Bassili, 1996; Kelley & Lamb, 1957; Petrocelli et al., 2007; Pomerantz, Chaiken, & Tordesillas, 1995; Swann, Pelham, & Chidester, 1988; Tormala & Petty, 2002; Wu & Shaffer, 1987).

**Resistance to Persuasion**

Of particular interest to the research presented here is the propensity for more certain attitudes to resist being changed in response to counterattitudinal persuasive messages. By studying the conditions under which a message fails to have its intended persuasive effect, research on resistance to persuasion has shed light on persuasion processes in general. McGuire (1964) conducted some of the earliest work on resistance to persuasion in order to investigate *inoculation theory*. According to this research, people are better prepared to defend a belief in the face of strong persuasive arguments if they are first given the opportunity to defend the belief against a weaker attack, much like
a vaccination prepares the body to respond to a more serious threat by introducing a weaker version of the same threat into the biological system. In the years since inoculation theory, research on persuasion resistance has expanded to encompass numerous accounts of the causes and consequences of resistance (see Knowles & Linn, 2004b).

Resistance to persuasion, however, can be defined at different levels. Perhaps the most basic approach is to define resistance as an outcome. At this level, resistance is demonstrated by the amount of change in an attitude after exposure to a counterattitudinal message (Knowles & Linn, 2004a; Wegener, Petty, Smoak, & Fabrigar, 2004). By this approach, predictors of resistance are those that relate to a small (vs. large) change in attitudes after a message. Studied in this way, a consistent predictor of persuasion resistance is amount of elaboration that went into forming an initial attitude. In general, attitudes based on relatively more thought are more resistant to change (Haugtvedt & Petty, 1992; Haugtvedt & Wegener, 1994; Petty, Haugtvedt, & Smith, 1995).

Alternatively, resistance can be considered at the level of a process. That is, although two people may evince an identical amount of resistance at the outcome level (no discernible change in attitude following a persuasive message), they may have resisted by different means. Just as attitude change can occur through different means (e.g., Petty & Cacioppo, 1986a), so too can the lack of attitude change. For example, Eagly and Chaiken (1995) propose a difference between active and passive resistance. The former is characterized by careful attention to counterattitudinal information in an effort to directly counterargue it, and the latter is characterized by selective exposure processes, whereby a person simply ignores the counterattitudinal information altogether.
Similarly, Wegener et al. (2004) propose that one can resist persuasion through either 
thoughtful or nonthoughtful means. Wegener et al. (2004) cite a study (Fabrigar, Petty, 
Wegener, Priester, & Brooksbank, 2002) showing that under conditions of high 
cognitive elaboration (where the target issue was of personal relevance, inducing a 
motivation to process the information more carefully), attitudes prior to a persuasive 
message predicted attitudes following the message, suggesting resistance to the message 
arguments. Importantly, this relationship was shown to operate through the thoughts 
produced in response to the message. That is, under high elaboration conditions, people 
were able to resist persuasion by using initial attitudes to thoughtfully engage with and 
ultimately resist the counterattitudinal message. Those under conditions of low cognitive 
elaboration (where the issue was not personally relevant and participants were 
additionally distracted by a secondary auditory task, limiting motivation and ability to 
process the information) were similarly able to resist the persuasive message, but they did 
not generate as many message-unfavorable thoughts, and these thoughts were not as 
strongly related to pre-message attitudes or to post-message attitudes. Thus, although 
both groups were able to resist persuasion, it is clear that they differed in the manner that 
they did so.

Beyond dichotomizing resistance processes into thoughtful and nonthoughtful, 
some have suggested that there are a number of more specific, individual strategies that 
people can use to resist persuasion. These strategies can be combined in resisting a 
persuasive message, and individuals can differ in their propensities to use and to 
anticipate using them (Briñol, Rucker, Tormala, & Petty, 2004; Jacks & Cameron, 2003). 
Jacks and Cameron (2003) identified seven such strategies that can be used in resisting
persuasion and that have been examined in resistance studies throughout the literature. By far the most thoughtful approach to resistance because of its demands to process the message and scrutinize its contents is that of counterarguing, which is characterized by directly addressing and refuting an argument advanced by the persuasive message. This strategy has long been of interest in persuasion research (Brock, 1967; Festinger & Maccoby, 1964; McGuire, 1964; Petty & Cacioppo, 1977; Xu & Wyer, 2012; Zuwerink & Devine, 1996). Another strategy, attitude bolstering, involves coming up with arguments that support one’s initial attitude but that do not directly address the arguments advanced in the message (Lydon, Zanna, & Ross, 1988; Sherman & Gorkin, 1980; Tannenbaum, Macauley, & Norris, 1966; Xu & Wyer, 2012), thus rendering it somewhat less effortful than counterarguing. Other less thoughtful strategies, due to their avoidance of directly engaging with and considering the counterattitudinal information itself, include source derogation, by which the validity of the message is discounted by finding fault in its author(s) (Festinger, 1957; Tannenbaum et al., 1966; Wright, 1975); message distortion, by which biased interpretation of the message arguments supports one’s initial attitude (Festinger, 1957; Festinger, Gerard, Hymovitch, Kelley, & Raven, 1952; Kunda, 1990); social validation, by which one reminds oneself of others who agree with the initial attitude (Festinger, 1954, 1957); assertions of confidence, by which one merely asserts that nothing could ever change one’s mind (Jacks & Cameron, 2003); negative affect, by which one responds to the message by getting upset (Jacks & Devine, 2000; Zuwerink & Devine, 1996); and selective exposure, by which one actively avoids processing any counterattitudinal components of the message (D. Albarracín & Mitchell,
2004; Brock & Balloun, 1967; Freedman & Sears, 1964; Pomerantz et al., 1995; Sears & Freedman, 1967).

**Perceived Bases of Attitude Certainty**

It is clear that, although the outcome of persuasion resistance can appear the same across a sample of people, they can have reached their resistance outcomes in a variety of ways, and the manner by which people resist a persuasive message can be important. For example, just as people become more certain of their changed attitudes under high (vs. low) elaboration (Barden & Petty, 2008), people also become more certain of their initial attitudes after resisting persuasion under high (vs. low) elaboration (Tormala & Petty, 2004a). Similarly, just as people tend to form more enduring attitudes when they are formed through more thoughtful (vs. less thoughtful) means (Haugtvedt & Petty, 1992), it may be that people end up with more enduring attitudes after resisting a persuasive message in a more thoughtful (vs. less thoughtful) way (Wegener et al., 2004).

Prior research has also shown that people can perceive the basis of their resistance to persuasion differently. For instance, regardless of the actual nature of a person’s resistance to a persuasive message, people can perceive their resistance as the result of weak counterarguing, and thus become less certain of the attitude than if they perceived their resistance as the result of strong counterarguing (Tormala, Clarkson, & Petty, 2006). Similarly, people can believe that they resisted a message through illegitimate means (e.g., derogating a minority source) and in doing so, become less certain in the attitude than they would if they believed they resisted a message through more legitimate means (Tormala, DeSensi, & Petty, 2007). It is clear that both the actual means by which people achieve resistance and the mere perceptions of how resistance was achieved have
consequences such as the degree of attitude certainty even when the same extent of resistance to persuasion is evinced. Therefore, it is possible that the bases of one’s attitude certainty—whether actual bases or merely perceived bases—can have consequences such as the means of resisting subsequent persuasive messages even when the degree of certainty is the same.

Although prior research has examined the different possible bases of attitudes and their consequences, no prior research has examined the different possible bases of attitude certainty and the consequences of these distinct bases. Indeed, this is the core issue addressed in this research. Just as research on attitude certainty has revealed a variety of its antecedents and consequences, research on attitudes more generally has addressed their antecedents (factors that contribute to their formation) and consequences (attitude-driven behavior). Unlike attitude certainty research, basic attitudes research has also considered different bases of attitudes. For example, attitudes can be differentially based on cognition or affect (e.g., usefulness versus happiness), on facts versus preferences, or on any of several unique attitude functions (e.g., ego defense). To take just one example of the importance of considering the different bases of attitudes, consider work documenting that attitudes can be based primarily on cognition, or affect, or some combination of the two (Crites, Fabrigar, & Petty, 1994; Rosenberg & Hovland, 1960). Among other reasons, understanding this basis of attitudes has proven to be important because affectively-based attitudes are more susceptible to affective persuasive appeals than are cognitively-based attitudes (Fabrigar & Petty, 1999). Importantly, this has proven to be true regardless of whether the affective versus cognitive basis of
attitudes referred to the real underlying structural basis of the attitude or merely the basis that people assumed their attitudes had (See, Petty, & Fabrigar, 2008).

Examining these different bases for attitudes has been an important component of attitudes research and implies a gap in the attitude certainty literature. Because perceived bases for attitudes impact persuasion outcomes, it may also be useful to consider the effect of perceived bases for certainty both on persuasion outcomes as well as the processes of persuasion. Until now, the bases for people’s certainty have received little attention. Although many antecedents to certainty have been identified, they are all theorized to predict certainty in a single sense of the term. On the surface, however, these antecedents to certainty would seem to differ on a number of dimensions. Compare, for instance, the evidence that those high in need for cognition (Cacioppo & Petty, 1982) and those high in need for cognitive closure (Webster & Kruglanski, 1994) both reach relatively high degrees of certainty. In the case of high need for cognition individuals, that certainty is presumably based primarily on extensive thought, whereas in the case of high need for cognitive closure individuals, it is presumably based on less thought and a general motivation to avoid uncertainty by reaching a quick conclusion. Current conceptualizations of attitude certainty suggest that the consequences of certainty occur regardless of how certainty is reached (e.g., those reaching certainty via greater thought

1 Note that other bases for attitudes have proven useful in past work. These include the extent to which an attitude is fact-based vs. preference-based (Goethals & Nelson, 1973; Jones & Gerard, 1967; Suls, Martin, & Wheeler, 2000) as well as whether it is based on a number of established attitude functions (Katz, 1960).

2 An exception to this is the work of Petrocelli et al. (2007), who proposed a difference between “clarity” and “correctness” aspects of attitude certainty. Clarity refers to a sense that someone knows his or her true attitude and correctness refers to a sense that one’s attitude is correct. They also argued that these dimensions of certainty can have distinct antecedents (e.g., repeated expression primarily influences clarity and social consensus primarily influences correctness), though they did not propose different consequences.
would be just as likely to resist persuasion as those who are certain as the result of less thought), but differences in the underlying bases of certainty may have unique consequences at the process level. In particular, the hypothesis tested in this research is that different bases of certainty may not achieve different outcomes (e.g., extent of resistance) but will achieve those outcomes through different means such that some bases of certainty lead to relatively thoughtful resistance strategies (e.g., counterarguing) whereas other bases of certainty lead to less thoughtful resistance processes (e.g., source derogation).

In support of this notion, prior research suggests that different attitude strength dimensions in general (i.e., accessibility, importance, etc.) achieve attitude strength outcomes differently than other attitude strength dimensions. For example, Eaton, Majka, and Visser (2008) argue that, while “strong attitudes” are ones that commonly guide behavior, persist over time, and resist persuasion, there are many means by which an attitude can become strong and many means by which these strong attitudes can manifest attitude strength outcomes. In particular, they distinguish between attitudes that are strong on the basis of attitude-relevant knowledge and attitudes that are strong on the basis of personal importance. They propose that attitudes associated with greater thought and attitudes that are personally important can all be considered “strong” in that they can be influential and durable, but they note that this influence and durability can occur through different mechanisms depending on whether the attitude is strong because one has considerable knowledge or because the topic is of personal importance. Attitude-relevant knowledge, they argue, provides cognitive abilities—like planning future behavior—that allow for attitude strength outcomes. Attitude importance, by contrast,
inspires motivations—like a motivation to maintain an opinion—that allow for the same attitude strength outcomes (see also Eaton & Visser, 2008)

Similarly, researchers have found that different dimensions of attitude strength can result in persuasion resistance but do so through different means. On the basis of factor analyses, Pomerantz, Chaiken, & Tordesillas (1995) categorized attitude strength dimensions as “embededness” (i.e., linking one’s attitude to one’s self) and “commitment” (i.e., remaining firmly committed to one’s attitude). Although higher levels of embededness and commitment similarly predicted greater persuasion resistance, commitment specifically predicted biased resistance processes (e.g., selective elaboration), and embededness predicted unbiased resistance processes (e.g., information seeking).

This research, however, dealt primarily with different attitude strength antecedents (e.g., high importance versus knowledge). It seems just as plausible that the perceived bases for the same strength antecedent could have differential effects as well. With regard to attitude certainty specifically, some of the antecedents such as extensive thinking would likely be viewed as legitimate or strong reasons to be certain whereas other antecedents such as being in a good mood would likely be seen as less legitimate or weak reasons for being certain. Further, like attitude strength generally, a person can simply perceive his or her certainty as having different underlying bases whether or not those bases have any standing in reality. The current research examines differential perceived bases of attitude certainty. Just as different categories of attitude strength dimensions can produce the same outcome through different means, so too might
different perceived bases of certainty reach certainty-related outcomes through different processes.

**Overview of the Present Research**

The present research proposes that different bases for certainty affect the means by which one reaches certainty-predicted outcomes. Specifically, we hypothesize that although attitude certainty will generally lead to persuasion resistance, as previously documented, those with stronger perceived bases for their certainty will resist through more thoughtful means than those with weaker perceived bases for their certainty. This hypothesis is in accord with prior research on the attitude strength construct suggesting that focusing only on durability outcomes obscures more nuanced effects at the process level. Because research on attitude certainty has uncovered antecedents that appear just as varied as the range of individual attitude strength dimensions, an analysis of how different underlying bases for certainty affect the process of resistance is a potentially promising endeavor.

Two studies tested the following hypothesis. Those who perceive their certainty as having stronger bases, such as having spent more time considering the object of evaluation, as opposed to weaker bases, such as having formed the attitude at a particular time of day, were expected to show more thoughtful resistance as indexed by (a) taking a longer time to process a counterattitudinal message, (b) generating more message-unfavorable thoughts in response to that message, and (c) generating message-unfavorable thoughts that demonstrate a more thoughtful attempt to resist the counterattitudinal advocacy.
Such effects could occur for a number of possible reasons. Before discussing why different perceived bases of certainty might have these effects, it is important to establish why people who are certain would process a message at all. If people hold an attitude confidently, additional information may seem unnecessary because they have already made up their minds. In the presence of counterattitudinal information, however, people may still expend effort to process it because it may contain new information previously unconsidered, because it is surprising that others hold the opposite opinion, or because the situation encourages processing the message through the lack of alternative tasks.

Once people confident in their attitudes begin to process counterattitudinal information, why might those with strong (vs. weak) perceived bases for that confidence proceed more thoughtfully? At least two mechanisms seem plausible: associations with general thoughtfulness and attitude-specific defensive confidence. First, when somebody has stronger reasons for their certainty, assuming that such reasons relate to thoughtfulness more generally, they may associate the attitude with greater thinking, an association that continues into the resistance process, encouraging thoughtful consideration of the persuasive message. Alternatively, when a person has stronger reasons for their certainty, they may have more confidence in their ability to withstand a persuasive attack on the attitude (see D. Albarracín & Mitchell, 2004) and thus exert more thought and effort in resisting persuasion. The studies presented here, however, are intended only to test whether such effects occur at all.

The following studies take two approaches to addressing these predictions. In the first study, participants’ perceived bases for attitude certainty were measured and the relationships between these self-reported bases for certainty and the outcome variables of
interest were examined. In the second study, an experimental approach was taken, manipulating whether participants thought they had strong or weak reasons for their level of attitude certainty. Using both of these research approaches allowed for convergence on a consistent account of the effects of perceived bases for certainty, highlighting the strength and pervasiveness of the outcomes observed.
Chapter 2: Study 1

The goal of the first study was to test whether peoples’ perceived reasons for their attitude certainty affect the processes leading to an important attitude strength outcome, namely resistance to persuasion. In this study, perceived reasons for certainty were assessed by providing participants with a variety of factors that could plausibly influence their degree of attitude certainty. These factors represented relatively strong and relatively weak reasons for certainty. Participants indicated the extent to which they thought each of these factors influenced the degree of attitude certainty they had reported moments before. Using this measurement approach allowed for the examination of the relationship between self-reported reasons for certainty and responses to a persuasive message. Because degree of certainty generally predicts whether a person resists a counterattitudinal message such that those with high (vs. low) certainty in their initial attitudes are more likely to resist attitude change (e.g., Bassili, 1996), when controlling for reported certainty, the reasons for that certainty are not necessarily expected to predict extent of attitude change. As noted earlier, strength of those perceived reasons, however, are expected to predict the means by which a person resists persuasion. Specifically, the greater the extent to which a person endorses strong reasons vs. weak reasons for their certainty, the more they should engage thoughtfully in the persuasion resistance process,
taking a longer time to process a counterattitudinal message, producing more thoughts in opposition to the message and producing thoughts that are more deliberative.

In order to test these predictions, the reasons underlying attitude certainty on an issue were assessed, and then these same individuals were exposed to a counterattitudinal persuasive message. The time spent reading this message was recorded, and the thoughts in response to the message were recorded and coded for valence and thoughtfulness. The number of words in each thought was also examined.

Method

Participants. Eighty-three Ohio State University undergraduates (57 male) enrolled in introductory psychology who received credit toward fulfilling a course requirement participated in the study. Sessions were conducted in a computer lab in groups of one to ten participants at a time. Dividers between computers prevented participants from seeing each other’s computer screens.

Procedure. Upon agreeing to enroll in the study, participants read a brief paragraph describing a proposed policy at their university that would require seniors to take a series of exams prior to graduating in order to establish competencies in skills relevant to their majors. Participants were then asked to indicate their attitudes toward the proposed policy and the amount of certainty with which they held their attitudes.

The next set of instructions explained that the researchers were interested in the reasons people have for holding an attitude with a particular degree of certainty. Participants then responded to a series of items, each asking them to indicate the extent to which a particular variable (e.g., amount of time spent thinking about the proposal)
affected their reported certainty. These items varied in how much they represented relatively strong or relatively weak reasons to be certain as established by pilot testing.

Following the items assessing reasons for certainty, participants read a short essay purportedly written by a university committee, arguing in favor of a proposed senior exam policy (Petty & Cacioppo, 1986a). The essay contained a mix of strong and weak arguments so as to provide a message that was persuasive but not so persuasive as to eliminate participants’ ability to counterargue. Reading time for the essay was recorded. Participants then listed the thoughts they had while reading the essay, which were later coded for valence and thoughtfulness by the participants and an independent rater. Finally, attitudes toward the exam policy and their corresponding certainties were again reported.

**Attitude Screening.** A dichotomous measure of participants’ attitudes toward senior comprehensive exams was used for screening purposes to identify individuals who were initially categorically in favor of or opposed to a senior exam requirement. For this measure, participants responded by answering *yes* or *no* to the following question: “Do you think students should start having to take these senior exams in order to graduate?” Participants for whom the message was not counterattitudinal, that is those who answered *yes* ($N = 8$), were removed prior to analysis.

**Predictor Variables.**

*Pre-message Attitude.* Participants’ initial attitudes toward the senior exam policy were assessed with a single continuous measure that asked: “To what extent do you agree with the proposal requiring college seniors to take a comprehensive exam in their major
before graduating?” Responses were indicated on a 7-point Likert-type scale anchored at
do not agree at all and agree completely.

**Pre-message Attitude Certainty.** After the continuous attitude measure,
participants indicated how certain they were in their attitudes toward senior
comprehensive exams on three 7-point semantic differential items: “How confident are
you in your attitude toward senior exams?” (completely unconfident—completely
confident), “How sure are you that your attitude toward senior exams is correct?”
(completely unsure—completely sure), and “How certain are you in your attitude toward
senior exams?” (completely uncertain—completely certain). Responses to these items
were found to be reliable ($\alpha = .79$) and were thus averaged to form a single attitude
certainty index.

**Reasons for Certainty.** The study provided instructions explaining that the
researchers were interested in knowing the reasons behind the amount of certainty people
express and asked participants to indicate the extent to which a series of variables
influenced their reported degree of attitude certainty regarding senior exams. Items were
framed as statements (e.g., “The amount of time I spent reading the proposal influenced
how certain I felt about my attitude toward senior exams”). Responses were indicated on
a 7-point Likert-type scale anchored at **strongly disagree** and **strongly agree**.

The items included both strong reasons and weak reasons for certainty, as
determined **a priori** on the basis of two other studies. In one, participants rated how good
various reasons were to be certain in one’s attitudes (see Appendix A) and in another, an
exploratory factor analysis was conducted on participants’ endorsement of these reasons
as the bases for their degree of certainty in an evaluation (see Appendix B). **Strong**
reasons included the amount of time spent reading the senior exam proposal, the ease with which the attitude was formed, the amount of the person’s prior knowledge about university policies, and how much the person had thought about the policy. By traditional criteria, the reliability of these four items is acceptable ($\alpha = .60$). Because these items tap a range of variables that were intended by the experimenter to represent strong reasons for certainty based on empirical research examining elements of the attitude formation process that reliably correlate with certainty (see Tormala & Rucker, 2007) and were shown in pilot data to cluster together and be perceived as stronger than the weak reasons (see Appendices A and B), they were averaged to form a single measure of tendency to endorse strong reasons for certainty. Weak reasons for certainty included the time of day during which the study was completed, the time of year at the time of participation, and the day’s weather. These three items demonstrated good reliability ($\alpha = .84$) and were thus averaged to form a single measure of tendency to endorse weak reasons for certainty.

To create a single measure of whether certainty is based more on strong reasons or weak reasons, a variable was computed by subtracting average endorsement of weak reasons from the average endorsement of strong reasons. Thus, higher scores on this measure indicate the tendency to endorse strong over weak reasons. Negative values on this measure indicate the tendency to endorse weak over strong reasons. Analyses consider results for this single measure in addition to examining effects for endorsement of strong and weak reasons independently.

**Dependent Variables.**
**Reading Time.** To measure how long participants spent reading the persuasive message, the response time feature in the MediaLab 2010 software (Jarvis, 2010) was used. The computer recorded the amount of time, in milliseconds, that a participant spent on the screen containing the essay arguing for senior exams before advancing to the next stage of the experiment. Participants were not constrained in how long they could spend reading the essay and were free to advance to the next part of the study whenever they were ready. For ease of interpretation, reading time data was translated from milliseconds into seconds.

**Thought Listing.** Participants were told to use a series of “thought listing boxes” to write any thoughts they had while reading the essay arguing for senior exams. They were instructed to write down all of their thoughts, “whether favorable to, opposed to, neutral toward, or irrelevant to the essay” (see Cacioppo, Harkins, & Petty, 1981, for more detail about thought listing procedures). Up to ten thoughts could be entered before advancing in the study, but participants were allowed to advance even if they could only generate fewer than ten thoughts.

The thoughts that were listed in response to the persuasive message were coded for both valence and thoughtfulness. Each of these ratings was completed by both the participants themselves and an external coder, blind to all data other than the content of the thoughts. To obtain participants’ coding of their own thoughts, the computer software MediaLab 2010 (Jarvis, 2010) displayed each of the thoughts participants generated earlier in the study and provided scales on which to categorize and rate them.

To obtain the coder’s data, the content of thought listings were provided to the coder in an Excel file with only a unique ID number associated with each response.
MediaLab had recorded the thoughts into an Excel file along with the other data. A new Excel file was then created with just the thoughts, their associated ID numbers, and two blank columns that were created alongside each thought, into which the coder entered the judged valence and level of thoughtfulness of each thought, respectively. The coder’s instructions for coding these dimensions mirrored the instructions that participants received themselves. These instructions are detailed below.

**Thought Valence.** To code the valence of the thoughts, the participants and external coder were instructed to indicate whether each thought was favorable toward, unfavorable toward, neutral toward, or irrelevant to the exam policy. Eight variables were thus created to represent the total number of message-favorable, message-unfavorable, neutral, and irrelevant thoughts generated by each participant as judged by the participants themselves and the coder. In addition, separate variables were also created to reflect the proportion of each category of valenced thoughts to the total number of thoughts generated. For instance, the proportion of negative thoughts was computed as the number of negative responses divided by the total number of responses generated.

**Thoughtfulness.** To code the thoughtfulness of each response, the participants were instructed to indicate the amount of thought that went into each of their responses. Specifically, they were told, “We all have responses to messages that are more or less thoughtful than others, so please rate how much thought went into each of your responses.” Participants rated each of their responses on a 7-point scale anchored at very little thought and a lot of thought. For the external rating of thoughtfulness, the coder was instructed to rate each thought on the same scale according to how much thought appeared to go into each response.
Because the purpose of this study was to examine thoughtfulness of the persuasion resistance process, the critical measure of coded cognitive responses to the message was the thoughtfulness of negative responses in particular (i.e., thoughts in opposition to the message). For both participant-coded data and externally coded data, a unique variable was created consisting solely of the average thoughtfulness of negative responses; that is, this variable was the average thoughtfulness of any thoughts coded as negative. For comparison purposes, similar variables were created for positive and neutral thoughts. The thoughtfulness of positive thoughts was the average thoughtfulness for thoughts coded as positive, and the thoughtfulness of neutral thoughts was the average thoughtfulness of thoughts coded as neutral.

*Word Count.* As a more “objective” measure of effort put into the thought generation task, the number of words in each thought was counted and stored as separate variables in the dataset. From these data, four new variables were computed: the average number of words across all thoughts generated, the average number of words in negative thoughts, the average number of words in positive thoughts, and the average number of words in neutral thoughts, as judged by participants.

*Post-message Attitudes.* Attitudes after reading the message were measured on the same continuous scale as the initial attitude ratings.

*Attitude Change.* To assess the effect of perceived certainty bases on attitude change following the persuasive message, an attitude change variable was created by subtracting initial attitudes from attitudes reported after the message. Thus, this measure represents change in the direction of the essay.

**Results**
For the following analyses, eight participants were removed from the dataset because they indicated that they agreed with the senior exam policy on the initial dichotomous attitude measure, rendering our persuasive message no longer counterattitudinal for those participants. This left $N = 75$ participants remaining in the sample.

**Predictor Variables.**

*Strong vs. Weak Reasons.* A within-subject t-test was conducted to compare endorsement of strong reasons for certainty to endorsement of weak reasons for certainty. Overall, participants were more likely to endorse strong reasons for certainty ($M = 4.20, SD = 1.07$) than weak reasons ($M = 2.80, SD = 1.51$), $t(74) = 8.00$, $p < .01$. A simple correlation was also computed to examine the relationship between endorsement of strong and weak reasons and showed that those who had a greater extent of endorsement of strong reasons also showed a greater extent of endorsement of weak reasons for certainty, $r(74) = .35$, $p < .01$.

*Pre-message Attitude.* In general, participants included in the sample reported a relatively negative attitude (i.e., below midpoint) toward the senior comprehensive exam policy ($M = 2.23, SD = 1.16$). To examine whether endorsement of strong or weak reasons varied with the initial attitude measure, a regression was conducted in which endorsement of strong and weak reasons for certainty were entered as unique predictors of pre-message attitude. Degree of opposition to comprehensive exams on the premeasure was not uniquely associated with either endorsement of strong reasons for certainty, $\beta = -.20$, $t(72) = -1.62$, $p = .11$, endorsement of weak reasons for certainty, $\beta = .15$, $t(72) =$
1.20, \( p = .23 \), or extent of endorsement of strong over weak reasons, \( \beta = -.18, t(73) = -1.59, p = .12 \).

**Pre-message Attitude Certainty.** Overall, participants in the sample reported relatively high certainty in their attitudes toward senior exams (\( M = 5.04, SD = 1.21 \)). Entering endorsement of strong reasons and endorsement of weak reasons in a regression model predicting degree of certainty in the initial attitude revealed that endorsing strong reasons for certainty was independently associated with a greater degree of certainty, \( \beta = .37, t(72) = 3.15, p < .01 \), and endorsing weak reasons for certainty was independently associated with less certainty, \( \beta = -.26, t(72) = -2.21, p = .03 \).

The single measure of relative endorsement of strong reasons vs. weak reasons for certainty was also used to examine the relationship between perceived reasons for certainty and reported degree of certainty. Because this composite measure of certainty basis correlates with the degree of certainty reported about initial attitudes, \( r(73) = .33, p < .01 \), level of initial attitude certainty was entered as a covariate in all subsequent analyses to examine effects of certainty bases independent of certainty extremity. Unless otherwise stated, initial attitude certainty was not significant in any of the following regression models (\( p > .10 \)).

**Dependent Variables.**

**Attitude Change.** A regression analysis in which the single item of relative endorsement of strong reasons over weak reasons for certainty, controlling for initial attitude certainty, was entered to predict attitude change showed that relative
endorsement of strong reasons for certainty was unrelated to extent of attitude change after reading the persuasive message, $\beta < .01$, $t(72) = .02$, $p = .98$.\(^3\)

**Reading Time.** A separate regression analysis was conducted to examine the effect of certainty basis on the amount of time participants spent reading the counterattitudinal message, again controlling for initial certainty. Results indicate that relative endorsement of strong reasons over weak reasons significantly predicted spending more time reading the essay, $\beta = .43$, $t(72) = 3.85$, $p < .01$. To further explore this effect, endorsement of strong and weak reasons were entered separately into a regression model rather than the single measure of certainty basis to predict reading time. Results from this model revealed both a unique effect of strong reasons such that greater endorsement of strong reasons as a basis for certainty was associated with spending more time reading the counterattitudinal message, $\beta = .24$, $t(71) = 1.96$, $p = .05$, and a unique effect of weak reasons such that greater endorsement of weak reasons as a basis of certainty was associated with spending less time reading the counterattitudinal message, $\beta = -.46$, $t(71) = -3.89$, $p < .01$.

**Thought Valence.** Another set of regression analyses considered the effect of perceived certainty bases on the thoughts participants generated in response to the persuasive message. Initially, the single measure of relative endorsement of strong vs. weak reasons for certainty was used to predict the total number of self-rated negative thoughts. Similarly, when relative endorsement of strong over weak reasons for certainty, initial certainty, and pre-message attitudes were entered into a regression model predicting attitudes reported after reading the essay, relative endorsement of strong over weak reasons for certainty did not predict post-message attitudes, controlling for pre-message attitudes and certainty, $\beta = -.05$, $t(71) = -.40$, $p = .69$. Pre-message attitudes, however, were uniquely and significantly predictive of post-message attitudes, $\beta = .35$, $t(71) = 3.12$, $p < .01$, and initial attitude certainty was uniquely, though marginally, predictive of post-message attitudes, $\beta = -.21$, $t(71) = -1.83$, $p = .07$.\(^3\)
thoughts generated (i.e., thoughts in opposition to the message). The results indicate that participants who endorsed strong reasons relatively more than weak reasons for certainty generated more self-rated negative thoughts in response to the counterattitudinal message, $\beta = .36$, $t(72) = -3.14$, $p < .01$. Participants’ endorsement of strong vs. weak reasons for certainty was not, however, uniquely associated with either the number of self-rated positive, $\beta = -.09$, $t(72) = -.77$, $p = .44$, or neutral $\beta = .11$, $t(72) = -.90$, $p = .37$ thoughts in response to the message. In the model predicting the number of message-favorable thoughts, however, there was a marginal effect of initial attitude certainty such that the more certain people were in their initial attitudes, the fewer positive thoughts they generated in response to the counterattitudinal message, $\beta = -.21$, $t(72) = -1.71$, $p = .09$.

Breaking these effects into strong and weak reason endorsement separately, these effects seem driven more by endorsement of weak reasons than strong reasons. For negative thoughts, endorsement of weak reasons was uniquely and significantly associated with a smaller number of self-rated negative responses to the message, $\beta = -.39$, $t(71) = -3.22$, $p < .01$, but endorsement of strong reasons was not significantly associated with a greater number of self-rated negative responses, $\beta = .18$, $t(71) = 1.48$, $p = .14$. For neither positive nor neutral thoughts in response to message were there any unique effects of strong or weak reasons for certainty on number of such thoughts generated, $ps > .44$.

This categorization of thoughts as favorable, unfavorable, or neutral toward the message was provided by participants rating their thoughts themselves. Thoughts were also categorized into valence by an external judge. Classification of thoughts by valence
was consistent between participants and coder. Agreement was high for the indicated number of negative thoughts, $r(81) = .89, p < .01$, positive thoughts, $r(81) = .83, p < .01$, and neutral thoughts, $r(81) = .35, p < .01$. A regression analysis found that, like the results for participant-coded responses, endorsing strong relatively more than weak reasons for certainty was uniquely related to generating more message-unfavorable thoughts as coded by the external judge, $\beta = .27, t(72) = 2.29, p = .03$. Additionally, also like the results for participant-coded responses, this association seems to be driven more by endorsement of weak reasons than strong reasons. A separate regression analysis that broke reasons for certainty into strong and weak separately was also conducted and found that endorsing weak reasons for certainty was uniquely and negatively associated with the number of message-unfavorable thoughts generated as coded by the judge, $\beta = -.28, t(71) = -2.21, p = .03$, but endorsing strong reasons for certainty was not uniquely associated with the number of message-unfavorable thoughts generated as coded by the judge, $\beta = .18, t(71) = 1.39, p = .17$.

Again similar to the results for participant-coded data, another regression analysis demonstrated that relative endorsement of strong over weak reasons for certainty was not uniquely associated with number of positive thoughts in response to the message, as coded by the external judge, $\beta = -.03, t(72) = -.21, p = .83$. In this model, however, greater initial attitude certainty was uniquely associated with generating fewer positive thoughts in response to the message, as coded by the external judge, $\beta = -.32, t(72) = -2.67, p < .01$. Breaking reasons for certainty into strong and weak reasons separately, a subsequent regression analysis did not find that either strong, $\beta = -.09, t(71) = -.74, p = .47$, or weak reasons for certainty, $\beta = 0.00, t(71) = -.03, p = .97$, were uniquely
associated with the number of positive thoughts generated in response to the message. Once again, however, greater initial attitude certainty was uniquely associated with generating fewer judge-coded message-unfavorable thoughts in this model, $\beta = -.30$, $t(71) = -2.47$, $p = .02$.

None of these variables are uniquely associated with the number of judge-coded neutral thoughts in response to the message, $ps > .36$.

**Thoughtfulness.** Finally, to test the hypothesis that stronger perceived bases of certainty would be associated with more thoughtfulness in the persuasion resistance process, the single measure of relative endorsement of strong vs. weak reasons for certainty was entered in a regression analysis to predict self-rated thoughtfulness of negative thoughts for participants who produced any negative cognitive responses to the message ($N = 58$). As predicted, endorsing relatively strong (vs. weak) reasons for certainty was associated with higher self-rated thoughtfulness of message-unfavorable responses, $\beta = .27$, $t(55) = 1.98$, $p = .05$. This effect, however, did not emerge for favorable, $\beta = .14$, $t(33) = .80$, $p > .10$, or neutral, $\beta = .48$, $t(11) = 1.36$, $p > .10$, responses among those who produced such responses, respectively. Further, consistent with the expectation that strong reasons and weak reasons exert opposite effects on the thoughtfulness of the persuasion resistance process, endorsing strong reasons for certainty was uniquely and significantly associated with more thoughtful message-unfavorable thoughts, $\beta = .34$, $t(55) = 2.17$, $p < .05$, whereas endorsing weak reasons for certainty was marginally associated with less thoughtful message-unfavorable thoughts, $\beta = -.25$, $t(55) = -1.68$, $p < .10$. No such effects emerged for message-favorable or neutral thoughts, $ps > .14$. 

29
These thoughtfulness ratings, however, were supplied by the same participants who generated the thoughts themselves, leaving open the possibility that those who are more likely to endorse stronger reasons for certainty are also more likely to rate their own responses as more thoughtful, though if this were true, one might expect thoughtfulness of all categories of thoughts to be elevated. Nevertheless, to address this empirically, the thoughtfulness ratings of an external coder, blind to participants’ endorsement of reasons for certainty, were included as a dependent variable in a set of regression analyses. First, using the single measure of endorsing strong vs. weak reasons for certainty in a regression analysis to predict thoughtfulness of negative responses as rated and coded by an external coder revealed essentially the same results as for participant-rated thoughtfulness. Endorsing relatively stronger reasons for certainty was again associated with greater thoughtfulness of message-unfavorable responses, $\beta = .34$, $t(54) = 2.57$, $p < .05$, but not the other categories of thoughts, $ps > .17$. Again breaking this finding into strong and weak reasons separately, results are consistent with self-rated thoughtfulness such that greater endorsement of weak reasons for certainty was associated with the coder’s indication of less thoughtful message-unfavorable responses, $\beta = -.34$, $t(53) = -2.46$, $p = .02$, but the relationship between endorsement of strong reasons for certainty and the coder’s indication of more thoughtful message-unfavorable responses failed to reach statistical significance but was in the same direction as self-rated thoughtfulness, $\beta = .23$, $t(53) = 1.56$, $p = .12$, and no effects were obtained on the other categories of thoughts, $ps > .10$.

Together, these results lend support to the notion that perceived bases of certainty are reflected in the objective level of thoughtfulness of cognitive responses rather than
merely participants’ potentially biased assessments of them. Indeed, participants’ ratings of thoughtfulness averaged across all thoughts listed were significantly correlated with the coder’s average rating of thoughtfulness across thoughts, $r(81) = .39, p < .01$. This agreement holds for both ratings of thoughtfulness for thoughts categorized (by either the participant or coder) as negative, $r(81) = .44, p < .01$, and ratings of thoughtfulness for thoughts categorized (by either the participant or coder) as positive, $r(81) = .57, p < .01$.

**Word Count.** A regression analysis was conducted to explore whether relative endorsement of strong (vs. weak) reasons for certainty predicted the number of words in message-unfavorable thoughts. Results of this analysis reveal that the relationship between relative endorsement of strong (vs. weak) reasons for certainty and word count for message-unfavorable thoughts is marginally significant, $\beta = .26, t(55) = 1.82, p = .07$. Breaking reasons for certainty into strong and weak reasons, no significant relationship with message-unfavorable thought word count emerges for either strong reasons, $\beta = .26, t(54) = 1.61, p = .11$, or weak reasons, $\beta = -.25, t(55) = -1.65, p = .10$. No effects were found for number of words in message-favorable or message-neutral thoughts, $p_s > .21$.

A correlation analysis showed that average ratings of thoughtfulness for each participant were related to the average number of words those participants used in the thoughts themselves for both participants’ ratings of their own thoughtfulness, $r(83) = .25, p = .02$, and coder’s ratings of thoughtfulness, $r(83) = .68, p < .01$. The reduced effect on word count as opposed to judged thoughtfulness thus suggests that although there is a relationship between reasons for certainty and effort put forth in resisting persuasion as indicated by word count, it also appears to be the case that the content of message-unfavorable thoughts is also varying as a function of perceived bases of attitude.
certainty since word count alone does not reflect this content difference as strongly as the
coder’s judgments of thoughtfulness.\(^4\)

**Discussion**

In Study 1, perceived bases for attitude certainty were measured and related to components of the persuasion resistance process. Specifically, individuals who reported having stronger (vs. weaker) reasons for their particular degree of attitude certainty (a) spent a longer time reading a counterattitudinal persuasive message, (b) generated more message-unfavorable thoughts, and (c) generated message-unfavorable thoughts that were rated as more thoughtful by both participants themselves and an external coder. Notably, the reasons people had for their certainty did not predict the actual extent of attitude change as a result of the persuasive message, only the means by which they resisted. These findings converge on the notion that people who perceive themselves as having relatively strong reasons for their attitude certainty engage in a more thoughtful persuasion resistance process than those who perceive themselves as having relatively weak reasons for their certainty.

A limitation of Study 1, however, is its correlational nature. It is unclear whether the measure of reasons for certainty truly assesses certainty bases of variable strength rather than some other construct. For example, it could be that individuals who are high

---

\(^4\) Notably, relative endorsement of strong over weak reasons for certainty remains predictive of judge-rated thoughtfulness in message-unfavorable thoughts when initial certainty and word count for negative thoughts are included in the regression model, \(\beta = .23, t(48) = 2.37, p = .02\). Thoughtfulness of message-unfavorable thoughts is also uniquely predicted by initial certainty, \(\beta = -.22, t(48) = -2.30, p = .03\), and by negative thought word count, \(\beta = .70, t(48) = 7.73, p < .01\). However, in a regression model predicting thoughtfulness of message-unfavorable thoughts as coded by participants themselves, relative endorsement of strong vs. weak reasons for certainty was not a significant predictor, controlling for negative thought word count, \(\beta = .21, t(54) = 1.52, p = .13\). In this model, negative thought word count was uniquely, though marginally, predictive of thoughtfulness of message-unfavorable thoughts as coded by participants, \(\beta = .24, t(54) = 1.86, p = .07\).
in need for cognition (Cacioppo & Petty, 1982) endorse more thoughtful reasons for their certainty and also engage in more thoughtful resistance. Or, it could also be that individuals who have a style of thinking characterized more by a faith in intuition (Epstein, Pacini, Denes-Raj, & Heier, 1996) endorse less thoughtful reasons for certainty and engage in less thoughtful resistance. Also, as with any study using a correlational methodology, causality cannot be inferred from the data. To address these limitations, Study 2 takes an experimental approach by manipulating the reasons people think underlie their attitude certainty and then examining their resistance behavior.
Chapter 3: Study 2

The goal of Study 2 was to conceptually replicate the effects found in the previous study and to more clearly test the role of perceived reasons for attitude certainty in persuasion resistance processes. This study differs from the previous one in two key respects. First, Study 2 used an experimental approach whereas Study 1 relied on correlational analyses. Rather than measure participants’ reasons for their indicated degree of certainty, the present study used a false feedback paradigm in which reasons for certainty were manipulated while degree of certainty was held constant. Participants were told that the computers being used to administer the study were able to conduct a “confidence analysis.” This analysis ostensibly used participant responses to prior questions to compute the degree of certainty with which they held their attitude about a target issue and the reasons for it. In reality, all participants received the same confidence score. Importantly, participants varied in the reasons that the computer provided for that score. Individuals in the strong reasons condition were told their confidence score was based on variables similar to the “strong reasons” used to assess perceived certainty bases in Study 1. By contrast, individuals in the weak reasons condition were told that their confidence score was based on variables similar to the “weak reasons” used to assess perceived bases of certainty in Study 1. Finally, those in the control condition received their confidence score without any mention of reasons. Thus, the perceived basis of an
individual’s attitude certainty was manipulated directly such that any differences in resisting persuasion between groups would relate to the different perceived bases for certainty.

Second, for Study 2, we took a different approach to measuring thoughtfulness in the persuasion resistance process. Rather than rate each thought on a continuous measure of general “thoughtfulness,” coders for this study instead categorized message-unfavorable thoughts into a number of previously-identified strategies for resisting persuasion (see Briñol et al., 2004; Jacks & Cameron, 2003). These strategies included relatively nonthoughtful tactics such as source derogation (e.g., Tannenbaum et al., 1966) and relatively thoughtful tactics such as direct counterarguing (e.g., Brock, 1967). Instances of counterarguing the points made in the persuasive message was used as an indication of thoughtful engagement in the persuasion resistance process instead of relying on a general measure of thoughtfulness in negative thoughts.

Hypotheses for this study mirrored those for Study 1. Specifically, people who receive strong reasons for their certainty are expected to spend more time reading a counterattitudinal persuasive message and produce more message-unfavorable thoughts in response to the essay, using a more thoughtful (i.e., direct counterarguments) means of resisting the message.

Method

Participants. One-hundred two Ohio State University undergraduates (34 male) enrolled in introductory psychology who received credit toward fulfilling a course requirement participated in the study. Sessions were conducted in a computer lab in
groups of one to ten participants at a time. Dividers between computers prevented participants from seeing each other’s computer screens.

**Procedure.** This study followed a procedure similar to that for Study 1 and used the same attitude object and persuasive arguments. Upon agreeing to enroll in the study, participants read the short description of the senior comprehensive exam proposal and were asked to indicate their attitudes and respond to a measure of attitude certainty embedded in several distractor items.

The critical difference from Study 1 is that rather than measure reasons for certainty using a series of scale items, perceived reasons for certainty were manipulated via a false feedback procedure. Upon responding to the attitude-relevant items, participants saw a screen containing the results of a “confidence analysis.” All participants were told that the computer had conducted an analysis and concluded that their level of confidence was high. Importantly, those in the *strong reasons condition* were given relatively strong reasons for their confidence and those in the *weak reasons condition* were given relatively weak reasons for their confidence, closely matching the items used to measure reasons for certainty in Study 1. Participants in a control condition were given the same level of computed confidence but without the presence of any reasons for the result. Belief in the computer’s result was then reported. The remainder of the study commenced as it did in Study 1.

**Screening Variables.**

*Attitude Screening.* A dichotomous measure of attitudes toward senior comprehensive exams was used to identify participants who were initially in favor of a senior exam requirement. For this measure, participants responded by answering *yes* or
no to the following question: “Do you think students should start having to take these senior exams in order to graduate?” Participants for whom the message was not counterattitudinal—that is those who answered yes (\(N = 20\))—were removed prior to analysis.

**Topic Familiarity.** Because the topic of senior exams is a fabricated issue and one commonly used in attitudes research, an item was included at the end of the experiment to assess whether participants had previously engaged in a study using this topic and consequently had learned that it was fabricated. Specifically, participants were asked: “Have you participated in any other studies that also dealt with the senior comprehensive exam policy issue?” Response options included: yes, no, and not sure. Participants who had already participated in a study using this persuasion topic (\(N = 4\)) were removed prior to analysis.\(^5\)

**Predictor Variables.**

**Pre-message Attitude.** Initial attitudes toward the senior exam policy were assessed with the same single continuous measure used in Study 1.

**Pre-message Attitude Certainty.** Two items were used to assess self-reported certainty in initial attitudes. Immediately following their attitude measure, participants were asked “How certain are you of your feelings for senior comprehensive exams?” and “How sure are you that your attitude about senior comprehensive exams is the correct attitude to have?” Responses were indicated on 7-point scales anchored at very uncertain—very certain and very unsure—very sure, respectively. Responses to these two

---

\(^5\) Although this screening item was included in Study 1, no participants had previously participated in an experiment using senior comprehensive exams as a persuasion topic.
items were significantly correlated, $r(100) = .40, p < .01$ and were thus averaged to form a single measure of certainty in initial attitudes.

**False Feedback.** Perceived degree of certainty was held constant at a high level and reasons for that certainty were manipulated using a false feedback procedure. Upon completing the attitude measure, certainty measures, and other filler items to distance self-reported certainty from the false feedback, participants were taken to a new screen that asked them to “please wait while the computer conducts a ‘confidence analysis.’” A progress bar on the screen reinforced the illusion that the computer was running such an analysis. After 11 seconds, the screen automatically advanced to a page containing participants’ “scores” on the confidence analysis as well as the manipulation of perceived reasons for certainty.

In order to control for degree of attitude certainty, all participants were told they had the same score on the confidence analysis. Specifically, all participants were given the following result: “Our program has calculated that your confidence in the opinion you just indicated is: 8 (on a scale from 1—10). That is, you are *moderately to very confident that senior exams should not be a graduation requirement.*” To reinforce this number, participants were asked to write their confidence score on the blank scratch paper pad available at their computer stations because they would be asked to recall this number later. Prior research has shown that individuals accept this type of false feedback (Tormala et al., 2007, Study 2).

In two of the three conditions to which participants could be randomly assigned, the false feedback also included reasons for the computed certainty. Participants in the control condition were not given any reasons for their confidence score; their results
screen included only the information described above. Participants in the strong reasons condition, however, were told that they received a relatively high confidence score for reasons that mirrored the items used in Study 1 to measure strong reasons for certainty. Specifically, they were told that their score was based on the amount of time they spent considering the senior exam policy, how quickly they indicated their opinions, and their prior knowledge about the topic. Participants in the weak reasons condition, however, were told that they received a relatively high confidence score for reasons similar to the items used to assess weak reasons for certainty in Study 1. Specifically, these participants were told that their score was arrived at because people who sit at that particular computer are usually more confident, because people are more confident at the time of day the experiment was taking place, and because most people are confident in their opinions (see Appendix C for the exact wording of this manipulation).

**Dependent Variables.**

*Belief in False Feedback.* Immediately following the false feedback manipulation, participants responded to an item intended to check whether they adequately believed their feedback and to allow for a test of whether this belief varied by condition. Participants responded to the question “How sure are you that the computer feedback about your attitude confidence is correct?” on a 7-point Likert-type scale anchored at very doubtful it is correct and very certain it is correct.

*Reading Time.* As in Study 1, the computer recorded how much time, in milliseconds, that a participant spent on the screen containing the essay arguing for senior

---

6 To make this more believable, before participants indicated their initial attitudes, they responded to several leading questions assessing their knowledge regarding OSU education policies meant to boost their perception of how much they knew about the topic (e.g., “Compared to another student in a different university, how familiar are you with the basic requirements for graduating at Ohio State?”)
exams before advancing to the next stage of the experiment. Once again, participants were not constrained in how long they could spend reading the essay and were free to advance to the next part of the experiment whenever they were ready. As in Study 1, reading time data was translated from milliseconds into seconds for ease of interpretation.

**Thought Listing.** Thoughts in response to the message were recorded as they were in Study 1. In this study, however, participants did not code their own thoughts. Rather, the thoughts they reported were recorded by MediaLab to be coded later by external raters only. Participants’ thoughts were compiled in a document that was printed and provided to two judges, blind to all data other than the content of the thoughts. They coded each thought for valence and resistance strategy, and these data were entered into an Excel file organized by participant ID number.

**Thought Valence.** Thought valence was coded using the same instructions as Study 1. Judges entered the total number of thoughts rated negative, positive, neutral, and irrelevant for each participant into corresponding fields in the Excel file. These judgments were then transferred to the complete SPSS data file for analysis. The two thought raters were in agreement at the subject level, indicating highly correlated numbers of thoughts coded as negative, $r(100) = .97, p < .01$, positive, $r(100) = .89, p < .01$, neutral, $r(100) = .64, p < .01$, and irrelevant, $r(100) = .99, p < .01$. To create single measures of each valence of interest and to resolve any discrepancies between coders, three valence variables were computed by averaging the numbers of negative, positive, and neutral thoughts, respectively, provided by each judge. Three proportion variables were then computed by dividing these composite indications of number of negative,
positive, and neutral thoughts by the total number of thoughts produced by each participant.

Resistance Strategy. Thoughts were also coded into six resistance strategies according to the coding scheme outlined by Jacks and Cameron (2003, Study 1): counterarguing, attitude bolstering, source derogation, assertions of confidence, negative affect, and social validation. As in Jacks and Cameron (2003, Study 4), instances of selective exposure were not anticipated given that all participants were made to read the message. Thus, selective exposure was not provided as a response category. The most thoughtful strategy by which to resist persuasion, and thus, the resistance strategy of most interest in this study, was counterarguing. Thought coders were in agreement at the subject level, indicating highly correlated numbers of thoughts coded as instances of counterarguing, $r(100) = .78, p < .01$. Thought coders were also in agreement, though less so, at the subject level in judgments of the other resistance strategies: attitude bolstering, $r(100) = .46, p < .01$, source derogation, $r(100) = .49, p < .01$, assertions of confidence, $r(100) = .59, p < .01$, and negative affect, $r(100) = .26, p < .01$. A correlation could not be computed for instances of social validation because one judge did not code any thoughts as instances of social validation, and the other judge only coded two thoughts as instances of social validation. Because agreement was relatively high, the data from the two judges were averaged for each resistance strategy to form single variables representing the number of thoughts produced in response to the message that were characterized as each type of resistance strategy. Separate variables, computed by dividing the number of each type of strategy by the total number of thoughts, were created to represent the proportion of total thoughts that were instances of
counterarguing, attitude bolstering, source derogation, assertions of confidence, negative affect, and social validation, respectively. Further, other variables were computed to represent the proportion of each type of strategy to the total number of message-unfavorable thoughts by dividing the number of instances of each type of strategy by the total number of message-unfavorable (i.e., resistance) thoughts.

*Word Count.* The number of words in each thought was counted and divided by the total number of thoughts generated by each participant, forming a single variable representing average number of words per thought.

*Post-message Attitudes.* Attitudes after reading the message were measured using the same scale as the pre-message attitude reports.

*Attitude Change.* A separate variable was computed to provide an indication of attitude change in the direction of the essay. To create this variable, initial attitudes were subtracted from attitudes reported after reading the message, indicating change in the direction of the message.

*Confidence Check.* At the end of the experiment, participants were asked to report the confidence score presented earlier in the study. All participants had been given a confidence score of eight and had been told to write this score down to make it easier to recall later. Therefore, it would be unclear whether a participant attended to the feedback information if he or she responded to this confidence check with any figure other than eight.  

**Results**

---

7 In this study, there was no manipulation check to ensure that participants attended to the reasons provided for their confidence score.
**Screening Items.** Three variables were used to determine whether the study’s experimental materials and subsequent analyses were appropriate for any particular individual: initial attitudes, topic familiarity, and the confidence check. First, 20 participants reported that they were initially categorically in favor of a senior comprehensive exam requirement, rendering the content of the false feedback information unsuitable and the arguments in the essay proattitudinal. It is striking that there were so many more participants in this study than in the previous study who were initially in favor of the proposed exam policy. Because the data for this study were collected toward the beginning of an academic term, it may be that students were less anxious about exams and were thus less likely to attach negative evaluations to comprehensive tests than in Study 1 where the data were collected later in the academic term. Toward the end of the term, students may have been more concerned with comprehensive tests (both midterms and final exams) and thus more likely to disagree with a senior comprehensive exam requirement. Importantly, however, the results of all analyses are not significant for participants who indicated that they were in favor of senior exams on the initial dichotomous attitude screening measure (ps > .20). Although power is considerably reduced in a sample of 20 participants, the absence of effects for this sample suggests at least that the perceived bases of confidence have their impact on engagement with a counterattitudinal persuasive message specifically.

Second, four participants reported previous experience in a study using senior comprehensive exams as an attitude object, which means they would have learned that

---

8 Indeed, participants who indicated that they agreed with the senior exam policy on the initial dichotomous attitude measure later expressed significantly less belief in the false feedback ($M = 4.00, SD = 1.78$) than those who indicated that they disagreed with the senior exam policy ($M = 4.86, SD = 1.35$), $t(92) = 2.26$, $p = .03$. 

43
this policy is not actually being considered at the university and that the arguments in the essay were created for research purposes only.\(^9\)

Finally, four participants responded to the confidence check with figures other than eight. Notably, three of these participants’ responses would correspond to having low confidence, with two participants entering the number four and one entering the number two.\(^10\)

Because the participants reported above have characteristics that obscure how they would have engaged with the manipulation and persuasive message, these data were not included in the subsequent analyses. Removal of these data points leaves \(N = 76\) participants. Including all participants in the sample would render the reported effects less significant. In fact, in most cases, these effects are nonsignificant when all participants are included in the analyses.\(^11\) Therefore, inclusion of participants who initially agreed with the senior exams proposal, had previously encountered this fabricated issue, and/or failed the confidence check introduces noise that obscures the effects of people engaging with a novel counterattitudinal persuasive message.

**Predictor Variables.**

**Pre-message Attitude.** Overall, participants included in the sample reported a relatively negative attitude (i.e., below midpoint) toward the senior comprehensive exam

---

\(^9\) Some nonsignificant effects become significant when these participants are removed, suggesting the noise introduced by their previous participation with this attitude object obscured effects of interest.

\(^10\) Although including participants who failed the manipulation check produces \(p\)-values that are slightly higher than when these participants are excluded, their removal had no implications for classifying effects as significant or nonsignificant.

\(^11\) The only exception is in the reading time measure. For the full sample, the omnibus F-test is not significant, but a planned comparisons analysis shows that those who received strong reasons still spent more time reading the message than those who received weak reasons for certainty, \(t(99) = -2.39, p = .02\).
policy ($M = 2.63, SD = 1.09$). Confirming that random assignment was successful, a one-way ANOVA did not find that pre-message attitudes differed by experimental condition, $F(2, 73) = .37, p = .69$.

**Pre-message Attitude Certainty.** Participants reported a relatively high degree of certainty in their initial attitudes ($M = 4.55, SD = 1.31$). A one-way ANOVA was conducted to test whether pre-message attitude certainty differed by condition and did not find evidence that reported certainty in attitudes toward the senior exam policy differed by group, $F(2, 73) = .25, p = .78$. Thus, random assignment appears to have been successful because groups did not begin with different attitudes or degrees of certainty.

**Dependent Variables.**

**Belief in False Feedback.** To ensure that the content of the false feedback, which differed by condition, did not inadvertently cause differential belief in that feedback, a one-way ANOVA was conducted. Results show no evidence that belief in the false feedback differed across groups, $F(2, 73) = .44, p = .65$. Critically, planned comparisons further indicate that those who received strong reasons for their confidence score did not seem to express significantly different belief in the feedback ($M = 5.04, SD = 1.19$) than those who received weak reasons for their confidence score ($M = 4.69, SD = 1.56$), $t(73) = -.93, p = .36$.

**Attitude Change.** A one-way ANOVA tested whether degree of attitude change following the persuasive message differed by condition. Results indicate that extent of attitude change did not differ by experimental condition, $F(2, 73) = .82, p = .44$. To examine attitude change another way, an ANCOVA was conducted to examine whether post-message attitudes varied by condition, entering pre-message attitudes a covariate.
These results reinforce the results of the other test, demonstrating that post-message attitudes did not differ across types of feedback, controlling for pre-message attitudes, $F(2, 72) = .86, p = .43$, although as expected, there was a main effect of pre-message attitudes on post-message attitudes, $F(1, 72) = 7.21, p < .01$. Thus, consistent with Study 1, no evidence was obtained to suggest that the reasons underlying attitude certainty affect extent of attitude change following a counterattitudinal persuasive message.

**Reading Time.** To assess the effect of feedback on amount of time spent reading the counterattitudinal essay, data were submitted to a one-way ANOVA. Results demonstrate that reading time differed across conditions, $F(2, 73) = 3.89, p = .03$. Tukey’s post-hoc comparisons of the three groups indicate that participants who received strong reasons for their confidence ($M = 111.66, SD = 45.77$) spent significantly more time reading the counterattitudinal essay than participants who received weak reasons for their confidence ($M = 77.77, SD = 38.13$), $p = .02$. Neither those who received strong reasons nor weak reasons for confidence differed significantly in reading time from those in the control condition ($M = 99.28, SD = 50.17$), $ps > .19$.

**Thought Valence.** A one-way ANOVA testing the effect of feedback on number of message-unfavorable thoughts in response to the message reveals a marginal overall difference in total number of negative thoughts generated in response to the message across conditions, $F(2, 73) = 2.56, p = .08$. Planned comparisons show a marginally significant effect such that participants who received strong reasons for their attitude certainty generated more message-unfavorable thoughts ($M = 2.67, SD = 2.43$) than those who received weak reasons for their attitude certainty ($M = 1.79, SD = 1.61$), $t(73) = -1.72, p = .09$. 

46
Results of a second ANOVA indicate that perceived reasons for certainty did not affect number of message-favorable thoughts in response to the essay, \( F(2, 73) = .70, p = .50 \). Planned comparisons also failed to find a difference in the number of generated message-favorable thoughts between those who received strong reasons for their certainty (\( M = 1.07, SD = 1.68 \)) and those who received weak reasons for their certainty (\( M = 1.34, SD = 1.07 \)), \( t(73) = .75, p = .45 \).

Finally, results of a third ANOVA indicate that perceived reasons for certainty had no effect on number of neutral thoughts in response to the message, \( F(2, 73) = .49, p = .62 \). Planned comparisons further fail to find a difference in number of generated neutral thoughts between those who received strong reasons for their certainty (\( M = .28, SD = .52 \)) and those who received weak reasons for their certainty (\( M = .36, SD = .50 \)), \( t(73) = .47, p = .64 \).

**Resistance Strategy.** In general, counterarguments, as judged by raters, constituted only a minority portion of message-unfavorable thoughts, as indicated by the proportion of counterarguments to total number of message-unfavorable thoughts across conditions (\( M = .35, SD = .33 \)). That is, most of the thoughts coded as unfavorable were not counterarguments. See Table 1 for the distribution of thoughts across all six resistance strategies. A correlation analysis does, however, demonstrate that for participants who produced message-unfavorable thoughts, the number of counterarguments generated, as judged by coders, is highly and significantly correlated with the total number of message-unfavorable thoughts, \( r(60) = .84, p < .01 \). Thus, although counterarguments increase with the number of negative (resistance) thoughts in general, these are not completely redundant variables, and an examination of
counterarguments in particular may provide additional understanding of participants’ resistance processes.

To test whether perceptions of certainty bases affected extent of counterarguing as rated by the judges, a one-way ANOVA was conducted. Results show only a marginal difference in number of counterarguments across conditions, $F(2, 73) = 2.09, p = .13$, but planned comparisons reveal that those who received strong reasons for their certainty generated a greater number of counterarguments ($M = 1.17, SD = 1.40$) than those who received weak reasons for their certainty ($M = .57, SD = .84$), $t(73) = -1.99, p = .05$.

No effects of perceived reasons for attitude certainty are found for instances of attitude bolstering, source derogation, assertions of confidence, negative affect, or social validation, $ps > .14$.

<table>
<thead>
<tr>
<th></th>
<th>Total Number</th>
<th>Proportion of Negative Thoughts</th>
<th>Proportion of Total Thoughts</th>
</tr>
</thead>
<tbody>
<tr>
<td>Counterarguing</td>
<td>.796</td>
<td>.347</td>
<td>.183</td>
</tr>
<tr>
<td>Attitude Bolstering</td>
<td>.671</td>
<td>.372</td>
<td>.156</td>
</tr>
<tr>
<td>Source Derogation</td>
<td>.191</td>
<td>.110</td>
<td>.057</td>
</tr>
<tr>
<td>Assertions of Confidence</td>
<td>.178</td>
<td>.094</td>
<td>.056</td>
</tr>
<tr>
<td>Negative Affect</td>
<td>.125</td>
<td>.069</td>
<td>.028</td>
</tr>
<tr>
<td>Social Validation</td>
<td>.013</td>
<td>.008</td>
<td>.003</td>
</tr>
</tbody>
</table>

Table 1. Resistance Strategies in Study 2.

Thoughts generated in response to a counterattitudinal persuasive message coded as instances of six strategies used to resist persuasion. Means of number of each strategy generated by each participant, proportion of each strategy to the number of message-unfavorable (i.e., negative) thoughts generated by each participant, and proportion of each strategy to the total number of thoughts generated by each participant are presented.
**Word Count.** A one-way ANOVA failed to find any differences across conditions in the average number of words participants used in their responses to the message, $F(2, 73) = .78, p = .46$. Likewise, planned comparisons fail to find a difference in average number of words used in responses to the message between those who received strong reasons for their certainty ($M = 15.02, SD = 7.58$) and those who received weak reasons for their certainty ($M = 20.34, SD = 22.51$).\footnote{Two participants wrote responses to the message with word counts more than four standard deviations above the mean, writing an average of 95 and 129 words per thought. Removing these subjects had no effect on the reported results, $ps > .50$. Likewise, to address potential issues of skew in the word count data, the average number of words per thought was log transformed, and an ANOVA using this as the dependent variable also failed to find differences across conditions, $F(2, 73) = .70, p = .50$.} Although a more appropriate measure of word count would be the number of words participants used for negative, positive, and neutral thoughts specifically, the method used to code data for this study precludes such an analysis. Because judges coded the number of thoughts of each valence for each participant but did not identify the valence of each individual thought, it is not possible to count the number of words for each valence or for each resistance strategy. It is worth noting, however, that in Study 1, rated thoughtfulness was more informative than mere word count and that this study used a content analysis, looking at resistance strategies in particular. Thus, not including a variable consisting of word count by valence or resistance strategy is unlikely to represent a meaningful loss in analysis.

**Discussion**

In Study 2, participants’ perceived bases for their attitude certainty were manipulated via false feedback. Compared to those who received weak reasons for their attitude certainty, those who received strong reasons for their attitude certainty (a) spent a longer time reading a counterattitudinal persuasive message, (b) generated a greater
number of message-unfavorable thoughts in response to the counterattitudinal message, and (c) generated a greater number of counterarguments—a highly thoughtful persuasion resistance strategy. Extent of attitude change did not differ by condition, suggesting that reasons for certainty once again failed to affect persuasion resistance itself, controlling for degree of certainty. These findings conceptually replicate the effects found in Study 1. Once again, these results suggest that when people perceive having strong reasons underlying their sense of attitude certainty, they engage in a more thoughtful persuasion resistance process than when they perceive having weak reasons underlying that sense of attitude certainty.

The experimental nature of this study also addresses the shortcomings associated with self-reported reasons for certainty used in Study 1. Because perceived reasons for certainty were manipulated, it was possible to infer that the results are due directly to the reasons for certainty themselves and not to some third variable that may enact dual influence on perceptions of attitude certainty bases and engagement with a persuasive message.
Chapter 4: General Discussion

Two studies tested the prediction that having stronger perceived bases for one’s attitude certainty is associated with a more thoughtful process of resisting persuasion, and the data supported this hypothesis. In the first study, participants’ perceived bases for their attitude certainty were measured by responses to a series of items representing relatively strong and relatively weak (categorized on the basis of pre-testing) reasons to be certain of an attitude. This study found that endorsement of the strong reasons over the weak reasons was associated with spending a greater amount of time reading a counterattitudinal persuasive message, generating more thoughts in opposition to the message, and generating message-unfavorable thoughts with more thoughtful content.

In the second study, participants’ perceived bases for their attitude certainty were manipulated using a false feedback procedure. Participants varied in whether they received a computed “confidence score” with no provided basis, a basis consisting of strong reasons, or a basis consisting of weak reasons, mirroring the reasons used to measure perceived bases for certainty in the first study. The results indicated that compared to those who received weak reasons for their degree of certainty, people who received strong reasons spent more time reading the counterattitudinal message and produced a greater number of thoughts characteristic of counterarguing—a thoughtful persuasion resistance strategy—but no more or fewer thoughts indicative of less
thoughtful strategies. Study 2, however, also found evidence that those who received strong reasons for certainty produced a greater number of message-unfavorable thoughts regardless of any particular resistance strategy, but this effect was only marginally significant.

Taken together, the results of these studies converge to support the prediction that having stronger perceived reasons for attitude certainty is associated with a more thoughtful approach to resisting persuasion. This is true both when thoughtfulness is measured by mere ratings of general thoughtfulness (by participants themselves and by an external rater) and when measured by coding thoughts into established persuasion resistance strategies. Although using different resistance processes could reasonably produce differences at the outcome level of persuasion resistance, it is interesting that in these studies, there were no effects at the level of attitude change. The absence of an effect on attitude change, however, is a null effect, and more evidence will be necessary to show that the actual extent of persuasion resistance is not sensitive to the perceived bases for certainty.

One important caveat is that the current studies are silent as to the reason why having stronger perceived reasons for certainty are associated with more thoughtful resistance to a persuasive message. It would be useful to establish what mediates the effect of perceived reasons for certainty on the thoughtfulness of message-unfavorable responses. If it is the case that attitudes held with a degree of certainty associated with stronger (vs. weaker) perceived bases are also associated with greater thinking in general, the extent to which the attitude object is associated with thinking (perhaps measured by assessing automatic associations) could mediate the effect. Alternatively, if the effect is
mediated by the extent to which people believe they can defend their attitudes against an attack, then an attitude-specific measure of “defensive confidence” (D. Albarracín & Mitchell, 2004) may be the key variable. This possibility is discussed more fully later. Future research will be necessary to unpack the mechanisms driving the effects found in these studies.

These results have implications both for attitude certainty and resistance to persuasion research. Contributing to attitude certainty research, these studies show that people can differ in why they think they are certain. Whereas existing research has provided a great deal of knowledge regarding the conditions under which people are more or less certain of their attitudes and the consequences of being certain, the evidence presented here demonstrates that people can perceive their sense of certainty as grounded in different kinds of reasons, including some that people think represent good reasons to be certain (e.g., having a lot of prior knowledge about the topic) and some that people think represent bad reasons to be certain (e.g., being influenced by the time of day).

Study 1 showed that people will endorse a variety of these perceived bases, and Study 2 showed that people will similarly believe feedback that their certainty is based on these different bases. Importantly, however, it is not just that people have the potential to perceive their attitude certainty as having these bases but that the particular bases they perceive having can be impactful. Just as researchers have studied different bases for attitudes themselves that have consequences for persuasion (e.g., cognitive vs. affective bases, Fabrigar & Petty, 1999), the perceived bases for attitude certainty also have consequences for persuasion processes.
These studies do not propose a revision of current attitude certainty theory but instead expand understanding of certainty. That is, the current research does not challenge the evidence that attitude certainty generally predicts resistance, persistence, and attitude-behavior consistency, but it proposes that a deeper analysis of attitude certainty uncovers differences in the processes that can be used to achieve such outcomes. In particular, these studies highlight the importance of the perceived reasons for certainty, but there are likely other dimensions underlying attitude certainty that have effects previously masked by examining only the degree of attitude certainty people express. These alternative bases of certainty remain to be developed, but this research provides some support for the importance of further unpacking attitude certainty, and, consistent with the suggestion of Eaton and Visser (2008), attitude strength indicators more generally.

Contributing to the broader research on resistance to persuasion, these studies reinforce the value of examining how people resist persuasive messages and the variables that influence relative use of some resistance strategies over others. Although research in persuasion has long assessed the valence or polarity of thoughts evoked by a message (i.e., whether they are favorable, unfavorable, or neutral to the message, Cacioppo et al., 1981), it is also useful to consider the content of those thoughts. The presented studies considered how resistance could vary in thoughtfulness (Eagly & Chaiken, 1995; Wegener et al., 2004) as a function of perceived bases for certainty. The content of message-unfavorable thoughts, however, can vary on more dimensions than thoughtfulness. For instance, responses to a message can vary in the extent to which they include links between the person responding and the message content ("self-relevant
responses," Shavitt & Brock, 1986). Cultures can also vary in the extent to which their cognitive responses to a message are characterized by relatively more individualistic vs. collectivistic (Triandis, 1995) or analytic vs. holistic content (Nisbett, Peng, Choi, & Norenzayan, 2001).

Although it is of theoretical value to know that the process of resistance to persuasion can vary according to variables like perceived bases for certainty, one might question why such differences matter, beyond mere curiosity and fleshing out the micro processes of persuasion. Although the presented studies do not address the consequences of different means of resisting persuasion, there are at least two potential consequences of different resistance strategies: attitude persistence and matching effects.

First, resistance achieved via a relatively more thoughtful process may last longer than resistance achieved via a relatively noughthoughtful process just as an attitude formed under higher cognitive elaboration demonstrates greater stability over time than an attitude formed under lower cognitive elaboration (Haugtvedt & Petty, 1992). That is, whereas someone who resists persuasion thoughtfully might retain the same attitude one week later, someone who resists less thoughtfully may show less attitude stability. They may even show change in the direction of the message one week later due to a process similar to the sleeper effect in which the relatively weak reasons to discount the message, generated through noughthoughtful resistance, become dissociated from the content of the persuasive message itself, giving way to a persuasive effect of the message over time (Gruder et al., 1978). Future research should include an indication of persistence by reassessing participants’ attitudes after a delay to examine whether the content of thoughts evoked by the message affects attitudes long-term.
A second possible consequence of the content of message-unfavorable thoughts is a matching effect whereby thoughts guide persuasion resistance to the extent that they match the way the persuasive message is framed. Following from the self-validation hypothesis (Petty, Briñol, & Tormala, 2002), when the means of resisting persuasion match the type of message content, one may have greater confidence in those thoughts and use them more in resisting persuasion. For example, if a persuasive message frames the issue as one that requires a great deal of thought to come to a conclusion (e.g., Wheeler, Petty, & Bizer, 2005, Study 2), a person may resist the persuasive message more to the extent that his or her message-unfavorable thoughts are more (vs. less) thoughtful. Alternatively, if a persuasive message places particular emphasis on the expertise of its position’s advocates, a person may resist the persuasive message more to the extent that his or her message-unfavorable thoughts are characterized by instances of source derogation. The studies presented here cannot address this particular hypothesis because the persuasive messages were not manipulated nor framed in a way that makes such matching hypotheses clearly testable. Future research would need to vary whether a persuasive message frames its arguments as relevant to a particular resistance strategy and assess whether extent of attitude change following the message can be predicted by the content of thoughts in response to the message and whether that content matches or mismatches the message.

Limitations and Alternative Interpretations

Measuring people’s perceived bases for their attitude certainty represents a challenge and is not without its issues. The correlational approach taken in Study 1 to assess perceived reasons for certainty and relate them to persuasion resistance processes
left open the possibility that a third variable enacted dual influence on both perceptions of certainty bases and on thoughtfulness of the persuasion resistance process. Among these possibilities are individual differences in how thoughtful people tend to be (Cacioppo & Petty, 1982) or how generally persuadable they perceive themselves to be (D. Albarracín & Mitchell, 2004; Briñol et al., 2004). Alternatively, people may reflect on the means by which they have resisted persuasion in the past to guide perceptions of whether their sense of certainty is based on more vs. less legitimate bases for certainty (e.g., Tormala et al., 2007), suggesting a resistance effect due less to bases for certainty and more to past resistance behavior.

In addition, the measurement approach assumes both that people have a reasonable degree of self-insight to reflect on the bases for their metacognitive evaluations (i.e., attitude certainty) and that the reasons used to measure those bases assess such self-reflections and not some other construct. For instance, the extent to which participants endorsed time of day or the weather as reasons for their degree of attitude certainty may not have reflected their actual belief in the influence of those variables but rather disengagement and not taking the experiment seriously, which then predicts less thoughtful persuasion resistance. These concerns, however, are assuaged by Study 2’s replication of the effects using a manipulation of perceived bases for certainty. This experimental approach held constant any individual differences and eliminated issues associated with measuring the perceived certainty bases.

A second issue lies in the content of false feedback provided to participants in Study 2. Although the intention was to provide reasons for a particular “confidence score” that were more or less legitimate reasons for certainty, the individual reasons
provided to participates may have done more than establish the legitimacy of their bases for certainty. Specifically, the content of feedback in the “strong reasons” condition may have inadvertently primed the concept of “thinking” because the reasons consisted of the amount of time spent considering the issue, how quickly the attitude was indicated, and amount of prior knowledge about the subject. Therefore, it is possible that the more thoughtful resistance demonstrated in this condition may have been due to being in a “thinking” mindset rather than having stronger reasons for certainty. However, mere priming alone is not sufficient to explain the results of Study 1 because all participants in that study were exposed to both the strong and weak reasons when they were being measured. Thus, if the strong reasons for certainty could prime the concept of “thinking” that would drive the processing and resistance effects, all participants would be in the same “thinking” mindset and thus expected to engage equally in a thoughtful resistance process. This, of course, is not what happened. Nevertheless, to address this possibility of a priming mechanism more directly, future research must use manipulations of perceived bases for certainty that do not mention “thought” in the reasons provided for a person’s degree of confidence. Instead, it may be necessary to clearly tell participants that their confidence is related to variables that are good (vs. bad) reasons on which to base certainty without giving details about precisely what those variables are.

To further establish whether these effects are based on the specific content of perceived bases for certainty (relevant to thinking or not) rather than whether perceived certainty bases are generally good or bad reasons to be certain, it would be useful to manipulate whether people perceive the same bases as more or less legitimate reasons for certainty. That is, the perceived basis of certainty (e.g., thoughtful or not) can be varied
independently of its perceived legitimacy. For example, study participants in one condition could be told that most people believe that basing opinions on quick, intuitive evaluations with little thought constitutes the best route to an attitude, and judgments should be held very confidently when they come to mind quickly. As such, judgments based on long, deliberative thought may be held just as confidently but most agree that it is not the best way to reach an opinion. In the other condition, study participants would be told the opposite: that high thought is a better way to reach certainty than low thought. Participants would then receive feedback suggesting their judgments are based more on high thought deliberation or on low thought intuition. Thus, if high thought vs. low thought bases for certainty are most important, those told their confidence is based more on deliberation will engage more thoughtfully in a resistance setting than those told their confidence is based more on low thought intuition. If instead perceived legitimate vs. illegitimate bases for confidence are most important, those told their confidence basis matches the more accepted confidence basis will engage more thoughtfully in a resistance setting than those told their confidence basis mismatches the more accepted confidence basis.

Another issue involves the construct validity of our reading time measure. In both studies, the amount of time participants spent reading the persuasive message was taken as an indication of how much they processed the message; however, it is unclear whether taking more time to read an essay is a valid indicator of greater depth of processing. Spending more time on the essay could indicate more distraction by extraneous stimuli, causing one to take longer to read the same amount of information. If this were the case, however, it is not clear why perceiving having stronger (vs. weaker) reasons for attitude
certainty would make one more distracted while reading a persuasive message on the
topic about which the certainty relates. More plausibly, taking longer to read a message
could indicate greater distraction by one’s thoughts in response to the message. That is,
while those who perceive having stronger (vs. weaker) reasons for certainty may not
necessarily process a message more deeply (i.e., attending, comprehending, etc.), they
more actively counterargue the points they are processing, thus taking them longer to get
through the message. Whether the reading time effect is due completely to processing,
counterarguing, or some combination cannot be answered conclusively with the current
data.

To get at this question, future research should employ methods commonly used to
examine extent of processing like manipulations of argument quality. When using this
manipulation, a variable is inferred to produce greater message processing if it interacts
with the message’s argument quality. When attending carefully to a message, people who
read strong arguments for a position become more favorable toward that position than
people who read weak arguments. When not attending to a message, people are less able
to distinguish strong from weak arguments and will not show differences in resulting
attitudes following either type of message. Thus, a variable associated with the extent to
which attitudes are more positive following strong arguments vs. weak arguments is said
to affect message processing (Petty, Wells, & Brock, 1976). If the perceived bases of
attitudes are actually affecting extent of processing, we would expect those with stronger
perceived reasons for certainty to distinguish more between strong and weak arguments
for the counterattitudinal position than those with weaker perceived reasons for certainty.
Such an effect, however, may be difficult to find because both those with strong and
weak bases for certainty are similarly likely to resist attitude change following a persuasive message, minimizing any differences in attitude change by argument quality. Additionally, such argument quality effects can be attenuated by biased processing (Petty & Cacioppo, 1986b), and because underlying reasons for certainty may induce varying degrees of biased processing, the results for a manipulation of argument quality will not necessarily demonstrate differences in true message processing definitively. This means that still other operationalizations of processing (e.g., memory for individual arguments) will be important to consider for uncovering the extent to which perceived bases for certainty impact message processing.

Finally, the current data cannot speak to the other end of the certainty continuum: perceiving strong or weak reasons underlying doubt in an attitude. Although Study 1 controlled for degree of certainty, participants were generally certain in their attitudes toward the highly relevant attitude object (senior comprehensive exams at the participants’ university). Also, in Study 2, participants were constrained to high certainty in the presented false feedback material. What, then, is the effect of having very good reasons to be doubtful vs. having very bad reasons to be doubtful? Presumably, if one doubts their current attitude, they will generally be more susceptible to persuasion: the conceptual opposite of the tendency for greater attitude certainty to predict resistance to persuasion. Following from the current data and the general theoretical framework motivating this research, though, those who perceive their doubt as being grounded in legitimate reasons are predicted to respond more thoughtfully to a persuasive message and process it more deeply than those who perceive their doubt as being grounded in less legitimate reasons, even if they demonstrate the same extent of attitude change. In other
words, although those with doubt are motivated to resolve the doubt (Festinger, 1957; Gal & Rucker, 2010; Heine, Proulx, & Vohs, 2006) they will do so by different means, depending on whether they perceive their doubt as grounded in strong or weak reasons. For example, if a persuasive message included both heuristic cues and strong arguments, as outlined in the elaboration likelihood model (Petty & Cacioppo, 1986a), we might predict that those with stronger bases for doubt would be more likely to use the arguments rather than cues as a means for changing their attitudes to resolve doubt, and those with weaker bases for doubt would be more likely to use the cues rather than arguments as a means for changing attitudes. This hypothesis is based on theory that using arguments as a route to attitude change is more effortful that using cues (Petty & Cacioppo, 1986a).

Predictions become more difficult to make, however, when the message consists of weak arguments but with positive cues, which means attending to arguments would lead to less attitude change than attending to cues. In this case, it may be that those with a stronger basis for doubt need to resolve that doubt only through thoughtful means, and in processing the message, are left without compelling arguments for its position and thus demonstrate less attitude change than those with a weaker basis for doubt. Alternatively, those with a stronger basis for doubt would only prefer to resolve their doubt through thoughtful means and in the absence of compelling arguments, the motivation to resolve doubt continues, and these people will show attitude change via the “next best” route: using simple cues just like those with a weaker basis for doubt.  

Clearly, the role of

---

13 Somewhat relatedly, persuasion research using the need for closure scale has shown that people with a high (vs. low) need for closure are motivated to reach closure quickly and will demonstrate attitude change
underlying bases in processes and outcomes relevant to attitudinal doubt has yet to be fully identified. In order to resolve these uncertainties and provide evidence for a more complete account of the perceived bases underlying metacognitive evaluations of attitudes, future work will need to assess the effect of reasons for doubt.

**Future Directions**

The studies presented here examined people’s reasons for certainty about a specified attitude. In the first study, for example, the reasons for certainty that participants endorsed were relevant to their attitudes about a proposed senior comprehensive exam. What is not clear is whether their endorsement of these reasons for certainty would vary by attitude object or whether there are stable individual differences in the extent to which people generally have strong or weak reasons underlying their subjective sense of certainty. Need for cognition (Cacioppo & Petty, 1982) is one individual difference that could relate to whether one tends to have stronger or weaker perceived bases for certainty. That is, people higher in the need for cognition may be more likely to endorse stronger reasons as the bases underlying their attitude certainty across a range of topics, and people lower in the need for cognition may be more likely to endorse weaker reasons as the bases underlying their attitude certainty across topics.

Although an association between the need for cognition and perceived bases for certainty seems plausible, it may also be the case that a more specific individual difference in the extent to which people have these sorts of perceived bases for their attitudes exists, and if this is the case, research must show that it is empirically distinct through the influence of simple cues when they are present, but when they are not present in a message, they will still demonstrate attitude change but via the influence of message arguments (Klein & Webster, 2000). That is, although there is a preferred route to persuasion, under a motivation for closure, people will reach a conclusion through any means necessary.
from the need for cognition. If there is indeed a stable individual difference in the extent to which people have stronger or weaker perceived bases for their certainty across targets of evaluation, Study 2 shows that this tendency can be overridden by the situation or by salient perceptions relating to a particular attitude in question. Even if a person tends to base their certainty on very strong reasons, when presented with evidence that his or her certainty about a particular attitude is based on relatively weak reasons (whether true or not), he or she will engage with a persuasive message just like people who spontaneously perceive their attitude certainty as having relatively weak bases. Future research on this potential individual difference will need to take into account the powerful effect of attitude-specific perceptions of reasons for certainty.

Certainty, as assessed in these studies, reflects a general sense of certainty, but other research has found that certainty can be further unpacked into two independent constructs: attitude correctness and attitude clarity (Petrocelli et al., 2007). Attitude correctness refers to a sense that one’s evaluation is valid or correct, and attitude clarity refers to a sense that one really knows where he or she stands about the topic. This research found that some variables previously shown to predict general attitude certainty actually more strongly predict either correctness or clarity specifically. For instance, attitude accessibility from repeated expression of an attitude predicts attitude clarity more strongly than correctness (Petrocelli et al., 2007, Study 2) whereas social consensus predicts attitude correctness more strongly than clarity (Petrocelli, et al., 2007, Study 3). Just as different certainty antecedents can have stronger effects on either clarity or correctness, perceived bases for attitude clarity may differ in nature from perceived bases for attitude correctness. The sorts of strong reasons for certainty used in the presented
studies would be expected to more closely represent bases for attitude correctness (e.g., how much prior knowledge a person had), but bases for attitude clarity may include how quickly an evaluation comes to mind or perceptions of one’s past attitude-relevant behavior (akin to self-perception theory, Bem, 1967). If one’s bases for certainty more closely relate to either correctness or clarity, that certainty may have different consequences. Although Petrocelli et al (2007, Study 4) showed that correctness and clarity independently predicted resistance to persuasion, one might predict, on the basis of the studies presented here, that certainty based on reasons more indicative of correctness vs. clarity may achieve that resistance via different means. Future research, then, could examine these effects by assessing and manipulating the extent to which people perceive their certainty as being due to correctness or clarity-relevant bases.

Finally, it will be important to extend the findings in the presented studies to attitude phenomena other than resistance to persuasion, namely attitude-behavior consistency, attitude persistence, selective exposure, and attitude accessibility. Attitude-behavior consistency has been previously examined as occurring through either of two processes: spontaneous and deliberative attitude-behavior processes (Fazio & Towles-Schwen, 1999). Attitudes can guide behavior through a spontaneous process in that they influence the interpretation of a situation and affect behavioral responses by creating a stimulus colored by one’s attitude that provokes a particular behavioral reaction. Alternatively, attitudes can guide behavior through a more deliberative process by influencing the construction of a consciously determined behavioral intention that is then put into action (see Ajzen, 1991; Ajzen & Fishbein, 1980). It is thus possible that certainty associated with strong perceived bases could lead to attitude-behavior
consistency via either process. Having thought a lot about the topic (or merely perceiving having thought about it) could make the attitude more accessible, allowing it to guide behaviors through the spontaneous process. Additionally, having stronger bases for certainty would be associated with an ability to use the attitude in constructing behavioral intentions and enacting attitude-consistent behaviors under conditions in which the behavior requires some planning. Certainty associated with weak perceived bases may just as easily guide behavior through the automatic process, assuming that the attitudes are equally accessible (discussed below), but whether they can guide behavior through the more deliberative process is less clear. It is possible that people with attitudes held with a certainty associated with weak perceived bases will ironically engage in more thinking when they engage in attitude-consistent behavior that requires some planning or effort. Because these attitudes are not grounded in as much prior thought, in order for the attitude to guide more deliberative behaviors, the person must think about the attitude, considering its implications for the behavior, before deciding whether to behave in a way consistent with that attitude.

This possibility suggests, however, that there may be times when attitudes held with certainty do not predict behavior. Take, for instance, an example of whether attitudes toward some politically-relevant topic guide behavior. If two people who have equal attitudes and held with equal certainty but one has stronger reasons for their certainty than the other, both may be just as willing to sign a pro-attitudinal petition when approached on the street, but the person with stronger reasons for his certainty will be more likely to drive across town and attend a meeting related to the attitude topic than the person with weak reasons for his certainty.
Perceived bases of certainty may also have implications for attitude persistence effects. The research demonstrating increased attitude stability as a consequence of greater attitude certainty, however, is sparser than that showing links between certainty and resistance or attitude-behavior consistency. The existing research has shown a simple correlation between attitude certainty and whether or not someone reports the same attitude on an issue after at least a 10-day span (with attitudes indicated on a dichotomous measure), such that those with greater certainty were more likely to report the same attitude at both times of measurement (Bassili, 1996). Some other studies have provided indirect evidence that attitudes held with greater certainty are more stable over time by showing that variables that typically predict certainty—need for cognition and on-line (vs. memory-based) processing—are predictive of attitude stability (Bizer et al., 2006; Haugtvedt & Petty, 1992). Thus, as with other attitude strength outcomes, some evidence at least suggests that certainty will predict persistence of the attitude over time. It remains to be seen, though, whether there are multiple routes to persistence as there are for resistance and attitude-driven behavior. It is possible, then, that in the case of this strength outcome, certainty with stronger perceived bases will lead to greater associated attitude stability than certainty with weaker perceived bases. Alternatively, it has been suggested that one may need to continue thinking about an attitude during the time between longitudinal attitude measurements in order to demonstrate persistence over time (Petty et al., 1995). This raises the possibility that people with stronger perceived bases for certainty would demonstrate attitude stability to the extent that they continue to think about the topic whereas those with weaker perceived bases for certainty would demonstrate attitude stability only to the extent that they merely form a strong object-
attitude link at the time of evaluation (i.e., the attitude is strongly accessible) without necessarily continuing to think about the topic in the interim. Of course, those who have stronger perceived reasons for their certainty may also form more accessible attitudes. The key difference, then, is how much continued thinking about the attitude object contributes to attitude persistence beyond mere accessibility. The nature of attitude certainty, its perceived bases, and attitude persistence outcomes and processes can only be uncovered by carefully conducted future research.

Of relevance to the speculation above, it is not yet clear whether certainty with different perceived bases make the associated attitude differentially accessible. In general, attitudes held with high certainty are more accessible than those held with low certainty (e.g., Holland, Verplanken, & van Knippenberg, 2003). The possible applications of the different perceived bases for certainty discussed above have made some assumptions about whether attitudes held with certainty associated with strong reasons are equally or differently accessible than attitudes held with certainty associated with weak reasons. More research will need to be conducted to address the relationship between bases for certainty and attitude accessibility.

Finally, perceived bases for certainty may have implications for selective exposure effects. Although some research has examined the effects of general attitude certainty on choosing to expose oneself to either attitude-consistent or inconsistent information (Sawicki et al., 2011), it may be worth examining the interaction between bases for certainty and the tendency to expose oneself to pro- or counterattitudinal information. Specifically, when people perceive that their certainty has strong bases, they may be more likely than people with weaker perceived bases for certainty to expose
themselves to counterattitudinal information because they believe they are more able to counterargue it and thereby resist persuasion. In this way, people with stronger perceived bases for certainty in an attitude will behave like people high (vs. low) in “defensive confidence,” an individual difference assessing the extent to which people think they can successfully defend their attitudes against an attack (D. Albarracín & Mitchell, 2004). People high (vs. low) in defensive confidence show a reduced preference for proattitudinal information and also a greater likelihood of attitude change in the face of persuasive messages (D. Albarracín & Mitchell, 2004; J. Albarracín, Wang, & Albarracín, 2011). The items used to assess defensive confidence, however, do not make reference to the strength of bases for certainty nor are they directed at particular attitudes. Therefore, the bases for certainty may influence an attitude-specific defensive confidence that then predicts willingness to read counterattitudinal information. Importantly, future research on the effect of perceived bases for attitude certainty on selective exposure effects will need to address the role of individual differences in defensive confidence, if any, in these processes.

Conclusions

The data presented here illustrate the importance of going beyond the level of attitude certainty and considering the myriad ways by which a person can come to reach a sense of certainty in an attitude and the bases on which they perceive their certainty to rest. Although researchers have generally considered all certainty to be a general metacognitive evaluation of a particular attitude, certainty can come in many flavors, providing different experiences within the same subjective sense of confidence. Such a decomposition of certainty is not meant to challenge existing research and theory on
attitude certainty. Indeed, the presented evidence and accompanying conclusions provide no evidence that the bases underlying certainty change the extent to which certainty leads to established attitude strength outcomes. Rather, it seems that not all certainty operates through the same process, and thus, it will be important to consider the role of what lies beneath the global sense of attitude certainty that has inspired so much research in attitudes and persuasion.


79


Appendix A: Ratings of Strength of Reasons for Attitude Certainty

In a pilot study, $N = 31$ undergraduate students (14 male) participated in exchange for partial credit toward an introductory psychology course requirement. These students rated the extent to which a variety of variables were good reasons to think a person is confident in their opinions and had not been previously exposed to these reasons for certainty in either scale response (Study 1) or false feedback (Study 2) fashion. For each variable, participants indicated whether they thought it constituted a good reason to think a person is confident in an opinion on a 7-point scale anchored at very bad reason to think a person is confident and very good reason to think a person is confident. Thus, variables with higher scores were judged as better reasons for confidence than variables with lower scores.

Participants rated eight possible reasons for certainty; Table 1 presents means and standard deviations for each item. To assess whether the items meant to represent strong reasons for certainty were indeed judged as stronger than the items meant to represent weak reasons for certainty, the four “strong” items were averaged to form a single rating of “strong reasons,” and the four “weak” items were averaged to form a single rating of the “weak reasons.” A within-subject t-test reveals that the “strong reasons,” on average ($M = 5.49$, $SD = .89$), were indeed judged as better reasons to think a person is confident than the “weak reasons” ($M = 3.34$, $SD = 1.38$), $t(30) = 7.94$, $p < .01$. 

86
<table>
<thead>
<tr>
<th>Item</th>
<th>$M$</th>
<th>$SD$</th>
</tr>
</thead>
<tbody>
<tr>
<td>“The person spends a long time reading about the topic.”</td>
<td>5.74</td>
<td>1.32</td>
</tr>
<tr>
<td>“The opinion is indicated relatively quickly.”</td>
<td>4.45</td>
<td>1.98</td>
</tr>
<tr>
<td>“The person has a lot of prior knowledge about the topic.”</td>
<td>6.32</td>
<td>.98</td>
</tr>
<tr>
<td>“The person had a lot of time to think about the topic.”</td>
<td>5.45</td>
<td>1.36</td>
</tr>
<tr>
<td>“The time of day when the opinion is expressed seems to be at a time when people feel more confident.”</td>
<td>2.84</td>
<td>1.95</td>
</tr>
<tr>
<td>“The location at which the opinion is expressed seems to inspire confidence.”</td>
<td>3.45</td>
<td>1.82</td>
</tr>
<tr>
<td>“The time of year when the opinion is expressed would suggest more positive feelings.”</td>
<td>2.97</td>
<td>2.07</td>
</tr>
<tr>
<td>“Many people are confident in general.”</td>
<td>4.10</td>
<td>1.78</td>
</tr>
</tbody>
</table>

Table 2. Means and Standard Deviations for Reasons for Certainty ($N = 31$).

Items above the dotted line were written with the intention of representing “strong reasons” and those below the dotted line were written with the intention of representing “weak reasons.”
Appendix B: Factor Analyses of Reasons for Attitude Certainty

The following data are results for an exploratory factor analysis conducted to extract items that “best” represent the two types of reasons (strong vs. weak) for attitude certainty used in the presented studies. In a second pilot study, 68 undergraduates in an introductory psychology class participated in a study for partial fulfillment of a course requirement. They read a brief advertisement for an mp3 player and indicated their attitude toward the device as well as their certainty in that attitude. They were then presented with a number of variables that may have influenced the amount of certainty they indicated about their attitude. These items were written to reflect both strong reasons for certainty (i.e., components of the attitude-formation process that have been shown empirically to be related to certainty) and weak reasons for certainty (i.e., plausible reasons for certainty that would not be expected, based on prior research, to translate to a truly strong attitude). Participants indicated the extent to which each of these reasons for certainty were actually bases for their own certainty about their attitudes toward the mp3 player.

Correlations between responses to these items were entered into CEFA (Browne, Cudeck, Tateneni, & Mels, 2008), and exploratory factor analyses were conducted using an oblique rotation. A two-factor solution (factors correlated at 0.15) for items that appeared best suited to a two-factor structure are shown in Table 2. This model showed
acceptable fit, \( RMSEA = 0.045, \chi^2 = 21.623, p = .30 \), suggesting these items appropriately represent two separate classes of reasons for certainty. These results converge with those in Appendix A, and support the use of these kinds of items to both measure and manipulate strong vs. weak reasons for certainty. Representative items were thus taken to assess strong vs. weak reasons for certainty in Study 1 and to manipulate these reasons in Study 2. Note that because “social consensus” did not load as expected, it was not used as a reason for certainty for either Study 1 or Study 2 because it is still unclear conceptually and empirically, whether it represents a good or bad reason to be certain.

<table>
<thead>
<tr>
<th>Item</th>
<th>Weak Reasons</th>
<th>Strong Reasons</th>
</tr>
</thead>
<tbody>
<tr>
<td>The amount of time you spent reading about the media player’s attributes</td>
<td>0.10</td>
<td>0.45</td>
</tr>
<tr>
<td>The ease with which you formed your opinion</td>
<td>0.15</td>
<td>0.44</td>
</tr>
<tr>
<td>The amount of prior knowledge about mp3 players</td>
<td>-0.25</td>
<td>0.63</td>
</tr>
<tr>
<td>What you thought most other people would think about the mp3 player</td>
<td>0.43</td>
<td>0.16</td>
</tr>
<tr>
<td>How much time you spent thinking about the mp3 player</td>
<td>0.12</td>
<td>0.47</td>
</tr>
</tbody>
</table>

Table 3. Factor Loadings for Reasons for Certainty: Maximum Likelihood Estimation, Oblique Rotation (N = 68).

Factor loadings over .40 appear in bold. Items above the dotted line were written with the intention of representing “strong reasons” and those below the dotted line were written with the intention of representing “weak reasons.” This distinction between strong and weak reasons also matches results from pilot data presented in Appendix A.
Table 3 continued

<p>| | | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>The time of day during which you are taking this experiment</td>
<td>0.84</td>
<td>0.05</td>
</tr>
<tr>
<td>Your surroundings at the time you formed you attitude</td>
<td>0.51</td>
<td>0.16</td>
</tr>
<tr>
<td>The time of year it is now</td>
<td>0.72</td>
<td>-0.10</td>
</tr>
<tr>
<td>What the weather is like today</td>
<td>0.61</td>
<td>0.07</td>
</tr>
</tbody>
</table>
Appendix C: Manipulation of Reasons for Confidence

**Strong Reasons Condition:**

<table>
<thead>
<tr>
<th>Your Confidence Analysis</th>
</tr>
</thead>
<tbody>
<tr>
<td>Our program has calculated that your confidence in the opinion you just indicated is:</td>
</tr>
<tr>
<td>8 (on a scale from 1-10)</td>
</tr>
<tr>
<td>That is, you are <em>moderately to very confident that senior exams should not be a graduation requirement.</em></td>
</tr>
<tr>
<td>This result is based on:</td>
</tr>
<tr>
<td>• The amount of time you spent considering the policy</td>
</tr>
<tr>
<td>• How quickly you indicated your opinion</td>
</tr>
<tr>
<td>• Your prior knowledge about the topic</td>
</tr>
</tbody>
</table>

**Please write your confidence score on the scratch paper at your computer station. You will be asked to enter this number later in the experiment.**
Weak Reasons Condition:

Your Confidence Analysis

Our program has calculated that your confidence in the opinion you just indicated is:

8 (on a scale from 1-10)

That is, you are moderately to very confident that senior exams should not be a graduation requirement.

This result is because:
- People who choose to sit in this computer are usually more confident
- People are more confident at this time of day
- Most people are confident in their opinions

Please write your confidence score on the scratch paper at your computer station. You will be asked to enter this number later in the experiment.

No Reasons (Control) Condition:

Your Confidence Analysis

Our program has calculated that your confidence in the opinion you just indicated is:

8 (on a scale from 1-10)

That is, you are moderately to very confident that senior exams should not be a graduation requirement.

Please write your confidence score on the scratch paper at your computer station. You will be asked to enter this number later in the experiment.