ORIGINS OF ATTITUDE CERTAINTY AND THEIR IMPACT ON RESISTANCE TO PERSUASION: THE ROLES OF EVIDENCE QUALITY AND VALUE-RELEVANCE

By

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The purpose of the current study was to explore the formation and consequences of attitude certainty based on good or poor evidence and having varying degrees of value-relevance. Specifically, it was proposed that attitudes would be held with high attitude certainty when value-relevant, regardless of the quality of evidence by which the attitude was first formed. However, if the attitude is not value-relevant, certainty would be greater for attitudes based on good, as opposed to poor, evidence. The consequences of attitude certainty, formed from good versus poor evidence at varying levels of value-relevance, were also explored by testing how well such attitudes resist persuasion, as well as the favorability of thoughts in response to a persuasive message. Both consequences were expected to be greatest when value-relevance was low and the initial evidence relevant to the attitude during formation was poor. The results showed that the predictions were only partly supported by the data. Although the value-relevance manipulation affected attitude certainty in the direction expected, the interaction between value-relevance and evidence quality only emerged for the thought favorability index data and not the attitude certainty and attitude change data. Limitations of the current study and future directions are discussed.
INTRODUCTION

Today, people are exposed to a never-ending stream of information coming from several sources (e.g. news media), much of which is speculation and anecdotal at best. For example, people on both sides of the health care reform debate appear to be highly certain about what should and should not be done to change America’s health care system. Despite a clear lack of knowledge about the issues and the inherent uncertainty about what will occur after any bill is passed many people still hold-fast to their positions. In many cases, people’s most certain attitudes appear to be based primarily on unsubstantiated claims.

Objectively, of course, it seems irrational to feel undoubting conviction about a belief without sufficient evidence. However, under conditions of inherent uncertainty, people often take shortcuts around rational thinking and rely on heuristics that can lead to bias in their attitudes or beliefs (Barden & Petty, 2008; Chaiken & Maheswaran, 1994; Gilovich, 1991; Kahneman & Tversky, 1984; Kunda, 1990). As people are often able to reach conclusions in the face of uncertainty, it is possible that even when they do not possess sufficient evidence or verification for their attitudes, people may feel the same level of conviction in their beliefs as those who do possess such evidence and verification. Evidence in support of this notion is found throughout the social psychology research literature.

In their seminal work on biased processing of evidence, Lord, Ross, and Lepper (1979) showed that people often respond to attitudes in terms of the symbols and metaphors they evoke (Abelson, 1976) and that people can often only bring biased and limited evidence to bear on important issues (Abelson, 1972; Nisbett & Ross, 1980).
Lord et al. (1979) argued that most peoples’ attitudes were of this nature toward the issue of capital punishment. Specifically, they tested the effects of exposing people to a set of conflicting, relatively objective information (i.e., fabricated published articles) on the issue. Participants were overwhelmingly resistant to change, and in fact, the effect of increasing their knowledge of both sides of the issue was to polarize their attitudes even further. Not only did their results suggest that people can hold opinions based on little evidence with a high degree of conviction, but they also suggest that people can bolster their attitudes even when they have available high quality evidence to the contrary.

Of primary interest to the current investigation is the subjective sense of assurance and conviction with which one holds an attitude. This construct is known as attitude certainty (Abelson, 1988; Festinger, 1954). That is, whereas an attitude is simply an evaluation of an object, attitude certainty is the subjective sense that one’s attitude is both clear and correct (Petrocelli, Tormala, & Rucker, 2007). For example, two people may have the same evaluation of a social policy, a product, or a person they know, but differ in how sure they are that their attitude is valid and accurate.

The question can be asked, then, if people’s attitudes toward an important social issue are not grounded in fact, what are the psychological forces that make them certain of these attitudes? One possibility proposed here is that when an attitude is value-relevant, it need not be based on a strong knowledge-base to be held with certainty. That is, motivational and cognitive processing biases operate during the formation of an attitude to permit the emergence of attitude certainty regardless of the quality of evidence available. Thus, the possibility that multiple “origins” of attitude certainty exist will be examined in the current study.
Such origins of attitude certainty will also be examined with respect to the quality of evidence available at the time of attitude formation. If attitude certainty is driven largely by value-relevance, which leads to biased processing, then it is reasonable to expect the quality of evidence for an attitude to be relatively irrelevant. However, evidence quality is expected to be less relevant to attitude certainty only when the value-relevance of an attitude is high. That is, while attitude certainty may sometimes originate from being cognizant of possessing substantiated evidence favoring an attitude, certainty may also emerge when one knows very little about the issue (or has very little substantiated evidence favoring their attitude). Thus, evidence quality may only be relevant to attitude certainty when value-relevance is relatively low.

Interestingly, it is unclear whether attitude certainty based on unsubstantiated evidence responds to persuasive appeals in the same way that attitude certainty based on substantiated evidence tends to. Typically attitudes held with a high degree of certainty resist change from persuasive appeals. To date, the existing literature on attitude certainty is mute on the issue of whether attitude certainty based on unsubstantiated evidence will display the same resistance to persuasive appeals. On one hand, one might expect that attitude certainty always increases resistance to persuasive appeals, because the subjective sense that the attitude is correct, itself, could always bolster resistance strategies. In fact, people with strong attitudes (e.g., high attitude certainty) are more likely to counter argue persuasive appeals than people with weak attitudes (Petty & Krosnick, 1995). On the other hand, there may be reasons to expect that certainty based on substantiated evidence would be more resistant to persuasive appeals than certainty
based on unsubstantiated evidence. This might be the case if successful counterarguing requires a strong knowledge base.

The current study specifically explores the resistance of attitudes, linked to high or low value-relevance and based on substantiated or unsubstantiated evidence. In order to elucidate these hypotheses, the relevant literature on attitude certainty, values, and evidence quality is described below.

**Attitude Certainty**

Most generally, attitude certainty is the subjective sense of assurance with which one holds an attitude (Abelson, 1988; Festinger, 1954). That is, while attitudes are evaluations of objects, people, or ideas, attitude certainty is the subjective sense that one’s evaluation is both clear and correct (Petrocelli et al., 2007).

Because of a history of being confounded in the literature, when defining what attitude certainty is, it is equally important to discuss what it is not. The most common mistake has been to confuse attitude certainty with *attitude extremity* (Gross, Holtz, & Miller, 1995). Attitude extremity refers to how polarized an attitude is, or rather, the degree to which the attitude is negative or positive. Typically, this is determined by measuring how far the attitude is from the midpoint on a bipolar response scale (Krosnick, Boninger, Chuang, Berent, & Carnot, 1993). Researchers have argued that because the two are often correlated, polarization also essentially reflects one’s certainty in their attitude (Cantril, 1946; Mehling, 1959). However, conceptualizing certainty in this way precludes the possibility of differences in certainty among neutral attitudes, as well as the possibility of low certainty among polarized attitudes. For example, one may have a neutral evaluation toward his/her mother’s car, but he/she may be highly certain of that
attitude because he/she has driven the car many times. Also, one may feel very negative
toward every libertarian policy, but may not be very certain of those attitudes because
he/she may know little about politics to begin with.

To examine certainty more directly, contemporary researchers use scales which
ask participants things like “How certain are you that you like or dislike the attitude
object?” (Bizer, Tormala, Petty, & Rucker 2006). These measures have permitted
researchers to measure attitude certainty as an independent construct. Furthermore,
attitude certainty is by definition a metacognitive construct, whereas attitude extremity is
not (Petrocelli et al., 2007). That is, attitude extremity represents the magnitude of one’s
evaluation of an object (i.e., the extremity of a thought), whereas attitude certainty is a
thought about one’s thought (i.e., about one’s attitude).

**Antecedents and consequences of attitude certainty.** Much of the research on
attitude certainty has focused on its antecedents and consequences. The antecedents of
certainty in the literature fall into one of two primary categories. These include the
“social/consensual” and the “cognitive/informational” antecedents (Gross et al., 1995).

An example of a “social/consensual” antecedent to certainty is the effect of
discovering that others share a similar attitude. This information often increases the
sense that the attitude is correct (e.g., Petrocelli et al., 2007). The idea that people
establish the validity of, and reduce uncertainty about, their beliefs by looking to the
thoughts of others has a long history in social psychology. For example, it is the basis of
Festinger’s (1954) social comparison theory, which argues that people often look to the
opinions of others in order to infer their own attitudes.
From a “cognitive/informational” perspective, attitude accessibility has been shown to increase certainty (Holland, Verplanken, & van Knippenberg, 2003). Attitude accessibility is the ease with which an attitude can be brought to mind, and is typically measured by the speed of responses to items on an attitude scale (Fazio, 1990). Like social consensus, accessibility has a long history of being examined with respect to attitude certainty (Fazio, 1979; Johnson, 1939; Smith, Kassin, & Ellsworth 1989). Specifically, it has been shown that people can use the speed with which they access their attitudes to infer the validity of their attitudes and subsequently feel certain about them (Bargh, 1989; Jacoby & Kelley, 1990).

Another cognitive/informational antecedent to certainty possessing involves the degree of knowledge one has about the attitude object; typically, the greater one’s knowledge the greater their certainty (Gross et al., 1995). An early, and well known, demonstration of this effect showed a difference in certainty between persons with “direct” or “indirect” experience with an attitude object (Fazio & Zanna, 1978). Fazio and Zanna (1978) had their participants form attitudes about different mind puzzle games either by actually playing them (direct experience) or merely reading about the games (indirect experience). Not surprisingly, certainty was greater for those with direct versus indirect experiences playing the games than indirect experience.

Research has also explored the consequences of attitude certainty, and has shown it to be reliably associated with resistance to persuasive appeals (Babad, Ariav, Rosen, & Salomon, 1987; Petrocelli et al., 2007; Swann, Pelham, & Chidester, 1988; Tormala & Petty, 2002). Tormala and Rucker (2007) discussed a possibility for this finding. Relying on the notion that certainty signals soundness and validity, they raised the
possibility that certainty heightens the need for persuasive attacks to be especially strong if they are to lead to attitude change. This is because attitude certainty could affect a message recipient’s cognitive responses to a counterattitudinal message such that the recipient’s thoughts about the arguments in the message are more negative when attitudes are initially held with certainty. For example, high attitude certainty can lead to more intense counterarguing of the arguments in a persuasive message, which has been shown to lead to greater resistance to persuasion (Swann & Ely, 1984). In this way, the message recipient’s attitude certainty affects their thought favorability toward a counterattitudinal message (Wegener, Downing, Krosnick, & Petty, 1995). That is, the overall favorability of one’s thoughts (i.e., positive or negative) toward the arguments in a counterattitudinal message can be influenced by attitude certainty, such that greater attitude certainty is associated with greater frequencies of negative thought responses. Subsequently, greater frequencies of positive thought responses tend to increase attitude change, whereas greater frequencies of negative thought responses tend to increase resistance.

Additionally, as attitude certainty often acts as a cue which signals that one’s attitude is sound, certain attitudes should be more likely to be used as guides for behavior (Tormala & Rucker, 2007). Indeed much research has shown that certainty is predictive of the degree to which attitudes appear to influence behavior (Bizer et al., 2006; Fazio & Zanna, 1978; Rucker & Petty, 2004; Tormala & Petty, 2002).

**Value-Relevance**

Research on the link between attitude certainty and the attitude’s association with important values also has a long in history social psychology (Blankenship & Wegener, 2008). Like attitudes, values have been ascribed a central status in psychological life.
This is not surprising given that values are defined as relatively ordered beliefs that serve as trans-situational guides for evaluation and behavior (Rohan, 2000). Allport (1961, p. 543) went so far as to describe values as a “dominating force in one’s life.”

Within the domain of attitudes research specifically, Katz’s (1960) influential work on the functions of attitudes gave values a central role by positing that one function of holding attitudes stems from the opportunity they provide to express important values. An example would be holding a positive attitude toward the death penalty in order to express a version of justice values.

Values have also been a major part of social judgment theory (Ostrom & Brock, 1968). Here, values are characterized as being a part of the self-concept, and attitudes and beliefs that are “embedded” with values are said be “ego-involved” (Sherif & Cantril, 1947). Because they are associated with the self-concept, ego-involved attitudes and beliefs should be especially strong (Johnson & Eagly, 1989). Empirical evidence has generally supported this hypothesis. For example, ego-involved beliefs help people to resist social pressures to engage in value-inconsistent behavior (Schwartz, 1992; Vaughn & Mangan, 1963).

Ostrom and Brock (1969) sought to test these ideas in the attitudes domain directly. They manipulated the degree to which an attitude toward a novel issue was linked to values by instructing some of their participants to search a persuasive message for specific words and phrases and draw connections between those phrases in values. As they hypothesized, attitudes formed while being linked to values were more resistant to a later persuasive attack. Later, Murray, Haddock, and Zanna (1996) explained this
effect in terms of Katz’s theory of attitude function, arguing that Ostrom and Brock (1969) had created value-expressive attitudes.

Johnson and Eagly (1989) developed the idea even further with a meta-analysis of studies in the social judgment paradigm. Across 38 experiments, issues more closely related to important values created strong attitudes. Thus, these researchers coined the term *value-relevant* involvement to describe the relationship between an attitude and important values (Johnson & Eagly, 1989).

In addition to arguing that attitudes associated with values tend to be associated with highly certain attitudes, Johnson and Eagly (1989) argued that value relevant-involvement can lead to biased processing of counterattitudinal messages. They drew on several researchers’ conceptualizations of the motivational role of values in the psychology of attitudes (e.g., Katz’s (1960) functionality theory of values in attitudes). Greenwald (1982) similarly proposed that value expression was a central motivation for involvement with attitudes. Likewise, Herek (1986) and Prentice (1987) both drew a distinction between instrumental motivations to hold attitudes, such as vested interests, and expressive or symbolic motivations related to values and the self-concept (Abelson, 1976). In this more symbolic way, the opportunity to express one’s values can lead to biased processing of attitude-relevant information.

**Effects of Evidence Quality during Formation on Attitude Certainty**

Neglected thus far in the literature, however, is the role of the quality of evidence in the formation of one’s level of attitude certainty. Although the effects of good and poor evidence on attitude certainty have received very little attention, one can speculate on some of its possible effects in attitude formation and change by drawing an analogy
with the previously described concepts of direct and indirect experience with an attitude object (Fazio, 1979). Possessing high quality evidence as the basis of a knowledge structure that supports an attitude should have effects similar to that of direct experience. Direct, versus indirect, experience with an attitude object leads to greater certainty about the attitude (Fazio, Zanna, & Cooper, 1978; Regan & Fazio, 1977). This is because a strong, logical structure of ideas and support from experts should provide a strong sense of validity, and should lead to increased certainty.

It has also been shown that attitudes can be based on vague impressions and symbols, and yet still resist persuasion (Abelson, 1972, 1976). In other words, sometimes attitudes based on low quality evidence can be associated with attitude certainty. In this way, the analogy between evidence quality and direct experience with an attitude object breaks down because certainty can be associated with attitudes without a strong knowledge structure.

Thus, it seems that another variable, perhaps motivational in nature, moderates the relationship between the quality of evidence making up a knowledge structure of an attitude and the level of certainty with which the attitude is held. It is proposed that the relationship between evidence quality and attitude certainty is moderated by value-relevance. Given the various motivational and biased cognitive processing strategies available to the individual, attitudes based on both high and low quality evidence are expected to result in relatively high attitude certainty when the attitude is linked to one’s important values. On the other hand, attitudes based on high quality evidence are expected to yield greater attitude certainty than attitudes based on low quality evidence when the attitude is not linked to one’s important values. Given the link between attitude
certainty and resistance to persuasion, crossing evidence quality and value-relevance should also have important implications for cognitive responses to persuasive appeals, and ultimately, resistance to the appeals.

**Hypotheses**

The current study was designed to test the consequences of the interaction between evidence quality and value-relevance with regard to attitude certainty and attitude change. Because the hypotheses of the current study are directly tied to the paradigm employed, it is important to first summarize the procedures. The study involved having participants form an attitude on the novel issue of reform of the court appointed attorney system in the state of North Carolina. Before they read the advocacy message, however, participants wrote either about a time when the value of justice was important to them or when a value not relevant to the issue was important to them. Next, participants were exposed to the evidence quality manipulation by reading a fabricated message about the court appointed attorney system that appeared to come from either a scholarly journal or an internet blog. Then, participants’ attitudes and attitude certainty were measured. Following the measurements, participants then read a message arguing against the first message on overhauling the court appointed attorney system. In order to assess the effects of certainty on attitude change, attitudes were measured again and a thought-listing was employed. The exact hypotheses the study addressed will now be discussed.

**Attitude Certainty**

It was hypothesized that attitude certainty would be affected by the degree to which one’s knowledge about an attitude object is substantiated by evidence. That is,
good (substantiated) evidence, as opposed to poor (unsubstantiated) evidence, during attitude formation is expected to lead to greater attitude certainty.

It was also hypothesized that value-relevance could bias not only the magnitude and direction of an attitude, but one’s attitude certainty as well. Specifically, during attitude formation, arguments and evidence (even poor evidence) for positions consistent with one’s values are expected to be evaluated more favorably than evidence for positions contrary to one’s values. It seems reasonable to suggest that the more extreme one’s attitude is the greater the motivation he/she is likely to have for certainty in that attitude. Thus, it was predicted that the independent variables of evidence quality and value-relevance, during attitude formation, would have main effects on attitude certainty.

Furthermore, for attitude certainty, a two-way interaction was predicted such that, those with attitudes linked to high value-relevance would be equally certain when their attitudes were based on good and poor evidence. However, it was predicted that for those with attitudes linked to low value-relevance, there would be more certainty in attitudes when their attitude was based on good evidence than when it was based on poor evidence.

**Attitude Change and Thought Favorability**

Beyond hypothesizing a unique and multi-faceted antecedent to attitude certainty, the current paradigm was designed to examine the consequences of this attitude certainty. Namely, do the different origins of attitude certainty lead to different consequences for attitude change?

As previously described, certainty has been shown to increase resistance to persuasion (Tormala & Rucker, 2007). However, if certainty originates from an association with the self-concept and not on something more substantial (e.g., knowledge
about the issue, beliefs of social consensus), then resistance to persuasion might not necessarily follow. For example, for people without a strong knowledge-base, generating counterarguments to the persuasive message could be relatively difficult, making resistance less likely. However, if one’s attitude is high in value-relevance, he or she may generate more negative thoughts about a counterattitudinal message than one whose attitude is low in value-relevance - leading to greater resistance. This is because self-generated counterarguments have been shown to be more effective than experimenter provided arguments for resisting persuasive attacks (Love & Greenwald, 1978; Perloff & Brock, 1980).

Thus, there appear to be two equally likely predictions for resistance in the current paradigm. The first possibility is that a two-way interaction will emerge such that there is a difference in resistance between levels of evidence quality in the low value-relevance condition (i.e., greater resistance to persuasion in the good evidence quality than in the poor evidence quality condition), but not in the high value-relevance condition. That is, when value-relevance is high it biases reactions to persuasive communications, rendering the quality of the information used to form the attitude irrelevant. The second possibility is that value-relevance does not moderate the relationship between evidence quality and resistance, indicating that the ability of an attitude held with certainty to resist persuasion does depend on the quality of information underlying the attitude. Thus, instead of an interaction, only one main effect, as well as two simple effects, could emerge. For the main effect, less attitude change could be found for the high value-relevance conditions relative to the low value-relevance conditions. The two simple
effects could emerge such that within each level of value-relevance, the good evidence quality conditions display less attitude change than the poor evidence quality conditions.

In order to explore the processes underlying attitude change, a measure of thought favorability (toward the counterattitudinal persuasive message) was included in the current study. Measures of thought favorability have often been used to assess whether attitude change was related to the amount and nature of the processing of the information of persuasive messages (Petty & Cacioppo, 1986; Wegener et al., 1995). For example, greater attitude change has been associated with a greater ratio of positive thoughts to negative thoughts toward a persuasive message (e.g. Wheeler, Briñol, & Hermann, 2007). Similarly, it was hypothesized that, regardless of the pattern of results obtained, attitude change would be positively correlated with thought favorability toward the counterattitudinal message. Further, it was expected that the thought favorability results would mirror the attitude change results such that the conditions which showed more positive thought favorability scores would show greater attitude change.

Also of interest to the current study were the specific effects of the evidence quality and value-relevance manipulations on cognitive elaboration of the counterattitudinal message (i.e., thoughts toward the counterattitudinal message). Of particular interest were the effects of the manipulations on the counterarguing. The thought-listing task provided an indicator of both elaboration and counterarguing, as it made possible a count of total thoughts and counterarguments toward the counterattitudinal message. As such, it was possible to test whether the evidence quality manipulation affected the perceived ability to counter argue. However, just as for attitude change, no specific hypotheses regarding counterarguing were drawn.
METHOD

Participants and Design

A total of 106 participants enrolled in introductory psychology courses at Wake Forest University participated in the study for partial course credit. The experiment was conducted using a 2 (value-relevance: high vs. low) × 2 (evidence quality: good vs. poor) × 2 (attitude: time 1 vs. time 2) mixed factorial design, with value-relevance and evidence quality serving as between-subjects variables and attitude serving as a within-subjects variable. Reported levels of attitude certainty, calculated attitude change (i.e., initial – final), and thought favorability toward the persuasive message were the dependent variables. Because attitude change was calculated by subtracting final attitudes from initial attitudes, the primary hypotheses regarding attitude change were analyzed using a 2 (value-relevance: high vs. low) × 2 (evidence quality: good vs. poor) analysis of variance (ANOVA), as were hypotheses regarding attitude certainty and thought favorability.

Procedure

Participants were randomly assigned to one of four experimental conditions. These conditions varied from one another only with respect to the two between-subjects variables. The persuasive message and dependent measures were the same across all four conditions.

All experimental materials were presented using MediaLab v2004 Research Software (Jarvis, 2006). The instructions of the experiment were self-paced, and participants advanced the instructions by pressing the space bar or a response key. The experimental procedures began with a “welcome” screen followed by instructions to pay
close attention to subsequent instructions in the experiment. After these first two screens, participants encountered the first experimental manipulation.

**Value-relevance manipulation.** Value-relevance was manipulated with a writing task. Specifically, participants were given three minutes to write about a previous experience. For the high value-relevance condition, participants wrote about an experience where either the value of justice or statesmanship was relevant to them (all participants in the high relevance condition chose to write about justice). In the low value-relevance condition, participants were asked to write about an experience where either the value of timeliness or statesmanship was relevant to them.

**Attitude formation and evidence quality manipulation.** On the next screen, participants were given information about a message they were about to read. They were informed that they were to read either an excerpt of journal article (good evidence quality) or an internet blog entry (poor evidence quality manipulation). The source of the material served as part of the evidence quality manipulation. The text was displayed as either part of a journal article or part of a screenshot taken from an internet blog. Also, the messages varied in that the good evidence quality message included statistics and citations (see Appendix A).

The message, relevant to the value of justice, was a fictitious paragraph advocating that the court appointed attorney system receive funding in order to be restructured and lead to increased justice in the outcomes for defendants. The message was displayed for two minutes. The message was designed to be pro-attitudinal. That is, it was expected that most participants would take the favorable stance advocated in the message.
**Initial attitude and attitude certainty.** Immediately following the attitude formation message, participants completed an attitude measure and a measure of attitude certainty. Attitudes toward restructuring and increasing funding for the court appointed attorney system were assessed using five 9-point semantic differential items (i.e., *bad-good, harmful-beneficial, negative-positive, unnecessary-necessary, useless-useful*). These items were averaged to produce an initial attitude score.

Attitude certainty was assessed with a three-item questionnaire, modified from Petrocelli et al. (2007) using 9-point response scales: *not at all* (1) and *extremely* (9). The three items were, “How certain are you that your attitude toward restructuring and increasing funding for the court appointed attorney system is the correct attitude to have?” “To what extent do you think other people should have the same attitude as you on this issue?” and “How certain are you that of all the possible attitudes one might have toward capital punishment, your attitude reflects the right way to think and feel about the issue?” The three items were averaged to produce an attitude certainty score.

**Counterattitudinal message and final attitude.** After completing the first set of measures, participants were then informed that they were about to receive more information to consider about overhauling the court appointed attorney system. This was followed by a counterattitudinal persuasive message advocating that the court appointed attorney system not be overhauled. The arguments in the counterattitudinal message were not only aimed at the facts presented in the first message, but also were based on points not previously considered (see Appendix B). This message was displayed to participants for two minutes. Subsequently, attitudes were measured again using the
same semantic differential items presented prior to the message; these items were averaged to produce a final attitude score.

**Thought-listing and thought favorability index.** Participants then completed a thought-listing task, as well as a thought favorability measure. For the thought-listing task, participants were asked to list any thoughts they had in response to the information about restructuring and increasing funding for the court appointed attorney system that was presented to them in the counterattitudinal message. They were informed that they may write as many thoughts as they desired, but to type only one thought per box (one was displayed per each screen frame).

For the thought favorability index, the thoughts participants typed were displayed on the screen, one at a time. Participants were asked to categorize each of their thoughts with respect to whether the thought was a positive, neutral, or negative thought toward the issue of overhauling the court appointed attorney system. Following the recommendations of Wegener et al. (1995), the difference between positive and negative thoughts was divided by the total number of thoughts to yield an overall thought favorability index such that more negative index scores represented more negative reactions to the message and more positive index scores represented more positive reactions to the message.

**Manipulation check.** In order to verify the efficacy of the value-relevance manipulation, participants responded to the question “How important is the value of justice to you?” using a 9-point response scale with *not at all* (1) and *extremely* (9) as the anchor labels. Finally, participants were debriefed about the purposes of the experiment,
thanked, and asked to respond to whether or not they will keep the purpose of the experiment secret.
RESULTS

Manipulation Check

For the manipulation check item data, a one-tailed independent samples t-test was conducted between the high and low value relevance groups. The analysis revealed a marginally significant difference between high ($M = 7.42$, $SD = 1.56$) and low ($M = 7.08$, $SD = 1.30$) value-relevance groups, $t(102) = 1.22$, $p = .055$. However, given that both conditions scored well above the midpoint of the response scale, it appears that the value of justice was activated in both conditions.

Attitude Certainty

Attitude certainty was generally high for the sample ($M = 6.19$, $SD = 1.84$). For the analysis of attitude certainty, a 2 (value-relevance: high vs. low) × 2 (evidence quality: good vs. poor) ANOVA was conducted (see Figure 1). From this analysis the predicted main effect for value-relevance was found such that greater attitude certainty was observed for the conditions of high value-relevance ($M = 6.12$, $SD = 1.79$) than for the conditions of low value-relevance ($M = 5.30$, $SD = 1.75$), $F(1, 104) = 5.58$, $p = .02$. However, the predicted main effect for evidence quality did not emerge; the good evidence quality ($M = 5.56$, $SD = 1.78$) and poor evidence quality conditions ($M = 5.86$, $SD = 1.83$) were both moderately certain of their attitudes, $F(1, 104) = .76$, $p = .39$. 
These effects were expected to be qualified by a two-way interaction. It was hypothesized that while evidence quality would have an effect on certainty within the low value-relevance conditions, certainty would be equally high for both levels of evidence quality in the high value-relevance conditions. This interaction was not significant, $F(3, 102) = .10, p = .75$. Thus, only some of the hypotheses for attitude certainty were supported.

**Attitude Change**

Attitudes were measured both after the receiving the initial message ($M = 6.83, SD = 1.42$) and after receiving the counterattitudinal message ($M = 5.88, SD = 1.85$). The attitude change data were analyzed with a 2 (value-relevance: high vs. low) × 2 (evidence quality: good vs. poor) ANOVA (see Figure 2). The predicted main effect of evidence quality on attitude change was not supported; attitudes based on good evidence quality ($M = 1.13, SD = 1.34$) showed no less change than attitudes based on poor
evidence quality \((M = .98, SD = 1.77), F(1, 104) = .28, p = .60\). A main effect for value-relevance was also predicted such that higher value-relevance should lead to less attitude change. Thus, the observed results were in the opposite direction expected. Surprisingly, participants with high value-relevance \((M = 1.47, SD = 1.74)\) reported greater attitude change than participants in the low value-relevance condition \((M = .64, SD = 1.21), F(1, 104) = 8.31, p < .01\).

Recall that there was also a sufficient theoretical basis from which to draw a prediction involving a pattern of data characterized by an interaction between evidence quality and value-relevance. However, the test of the interaction was not significant, \(F(3, 102) = .88, p = .35\). Analyses of each individual item of the semantic differential were also conducted. None of the items produced results differing from those revealed in the analyses of the items averaged together.
Thought Favorability Index

Thought favorability toward the counterattitudinal message for the sample was generally negative ($M = -.25, SD = .59$). As expected, thought favorability toward the counterattitudinal message was positively correlated with attitude change, $r(104) = .45, p < .001$. That is, as thought-responses toward the persuasive message became less negative, greater attitude change was observed. In an attempt to understand the observed pattern of attitude change scores, the thought favorability index data was also analyzed with a $2$ (value-relevance: high vs. low) $\times 2$ (evidence quality: good vs. poor) ANOVA. Interestingly, an interaction between value-relevance and evidence quality emerged with the expected pattern, $F(3, 102) = 2.48, p < .03$ (see Figure 3).

Figure 3

Thought Favorability Index Means by Value-Relevance and Evidence Quality

When value-relevance was low, thought-responses were less negative when attitudes were based on poor evidence than when they were based on good evidence, $t(102) = 2.62, p = .01$. However, no such difference was observed when value-relevance
was high, $t(102) = -.52, ns$. Thus, the thought favorability data closely resembled the interaction hypothesized for attitude change to the extent that thought favorability toward the counterattitudinal message reflects attitude change. That is, attitude change, or lack thereof, typically aligns with positive and negative thought favorability index scores respectively. Although the attitude change data did not support either hypothesis that can be inferred from the literature, participants did appear to react to the counterattitudinal message in a way that would be expected given previous data. However, it is not clear why the attitude change and thought favorability data correlated positively (as they typically do), yet failed to correspond with respect to the experimental conditions.

**Follow-up Analyses**

Additional analyses were conducted in light of both the obtained interaction between value-relevance and evidence quality on the thought favorability data, and the attitude change results. Specifically, the thought favorability index did produce an interaction between value-relevance and evidence quality that is consistent with expectations given the likely correspondence between thought favorability and attitude change. Also the high value-relevance groups showed more attitude change than the low relevance groups, despite the fact that the high relevance groups were higher in certainty, which should have caused participants to be more resistant to the counterattitudinal message.

One explanation for the greater attitude change in the high value-relevance condition is that there was a difference in valence between the high and low value-relevance attitude conditions. That is, the greater amount of change observed in the high value-relevance conditions could be due to the fact that participants in the high value-
relevance conditions had more favorable attitudes to begin with, and thus, a greater possibility of detecting change. Some of the data are consistent with this explanation. In fact, the high value relevance participants did have more positive attitudes prior to the persuasive message ($M = 7.27, SD = 1.28$) than the low value-relevance participants ($M = 6.40, SD = 1.41$) $F(1, 104) = 10.98, p < .01$. However, additional analyses suggest that this difference does not fully explain why greater attitude change was observed for the high value-relevance participants. Specifically, when controlling for attitude extremity prior to the persuasive message, there is still a significant difference between the attitude change observed between the high and low value-relevance conditions $F(1, 104) = 8.15, p < .01$.

An additional reason that attitude change was observed in the high value-relevance conditions, but not in the low value-relevance conditions, has to do with the participants in the high value-relevance conditions having the value of justice more strongly activated. In this case, participants in the high value-relevance conditions may have had more salient ideas of fair thinking or “naive theories” of the effects of biases. According to Wegener and Petty’s (1995) Flexible Correction Model, people who are motivated and able to correct for biases often apply their naive theories of how a context can cause bias and can then correct, correct in the wrong direction, or overcorrect for that perceived bias (Wegener & Petty, 1995). For example, in a study of jury making decisions by Sommers and Kassin (2001), it was shown that high need for condition participants often overcorrected for the perceived biasing effects of inadmissible evidence, in that their judgments move in the opposite of the direction implied by the evidence (Sommers & Kassin, 2001). Similarly, Briñol, Rucker, Tormala, and Petty (2004)
showed that individuals high in need for cognition overcorrected for their experimentally-induced self-perceptions of a tendency to resist persuasive appeals. Specifically, high need for cognition individuals who believed they tend to resist persuasion showed significantly greater attitude change in response to a persuasive message advocating for a new foster care program than both their low need for cognition counterparts and high need for cognition individuals who believed they tend not to be resistant to persuasion.

In the current study, half of the participants had recently written about holding the value of justice. If they were motivated to correct for their possible biases (from the value of justice being activated) they may have had greater awareness that their processing of the counterattitudinal message may be biased. Such awareness could have led to attempts to correct for their possible bias when reporting their attitudes. Post hoc analyses of the attitude change data, with respect to the thought favorability index and value-relevance, offer some support for this possibility.

Following the recommendations of Cohen, Cohen, West, and Aiken (2003), a hierarchical regression analysis was conducted treating the thought favorability index (continuous, mean centered) and value-relevance condition (dummy coded: 0 = low, 1 = high) as the predictors of attitude change. Main effects were examined in step 1 of the analysis and the interaction was examined in step 2.

This analysis showed the same significant main effect for value-relevance as observed earlier, such high value-relevance was associated with more attitude change, $\beta = .30$, $t(102) = 3.63$, $p < .001$. However, this main effect was qualified by a thought favorability × value-relevance conditions interaction, $\beta = .30$, $t(102) = 2.30$, $p < .03$. As illustrated in Figure 4, this interaction revealed a significant relation between thought
favorability and attitude change in the high value-relevance conditions, $\beta = .43, t(102) = 5.09, p < .001$, but not in the low value-relevance conditions $\beta = .04, t(102) = .90, ns$. Thus, the participants in the high value-relevance conditions showed significantly greater attitude change when their thoughts were relatively less negative, as opposed to more negative.

Figure 4
Predicted Regression Means of Attitude Change Regressed onto Thought Favorability Index and Value-Relevance

These data suggest that if participants in the high value-relevance conditions were relatively less negative in response to the persuasive appeal, they were willing to correct for their bias when reporting their attitudes. However, it appears that they may have overcorrected. Essentially, these participants reported attitudes more consistent with the counterattitudinal message despite the fact that their thoughts about the message were negative when their attitudes were based on either good or poor evidence.
DISCUSSION

In addition to examining the roles of value-relevance and evidence quality on attitude certainty, a primary purpose of the current investigation was to explore the effects of different origins of attitude certainty (that these variables create) on attitude change. It was hypothesized that increased value-relevance would interact with evidence quality such that high value-relevance would lead to certainty across good and poor evidence quality conditions, whereas in low relevance conditions, only participants in the good evidence quality conditions would be high in certainty.

However, only three statistically significant results emerged. The first was the main effect for value-relevance on attitude certainty, such that higher value-relevance led to higher certainty. This finding is consistent with previous research showing that value-relevance is related to attitude certainty (Johnson & Eagly, 1989). In the current study, activating the value of justice likely caused participants in the high value relevance conditions to form their attitudes in terms of their values, which are themselves important aspects of the self. If attitudes are formed in relation to the self, they are more likely to be held with certainty. Unfortunately, it cannot be assured that attitudes formed in the high value-relevance conditions were more strongly associated with the value of justice than those formed in the low value-relevance conditions, because the manipulation check revealed that both groups reported that they valued justice at a level well above the midpoint. However it could be that, when prompted, people tend to express that they value justice highly.
The second main effect observed was that of value-relevance on attitude change, such that higher value-relevance led to more change, which is the opposite of the direction which was predicted. One likely explanation for this finding is that the increased value-relevance, and thus relevance to the self, led to more processing of the counterattitudinal message and an increase in its efficacy. However, there was no difference in the number of thoughts participants had about the message for the thought listing (positive or negative) between the high and low value-relevance conditions. Another explanation suggested by the results is that the participants in the high value-relevance conditions were correcting for biased processing of the counterattitudinal message when reporting their attitudes. This could occur if, for example, they perceived that the writing task about justice (which caused high value-relevance participants to be more certain of their initial attitudes) was causing their negative reaction to the counterattitudinal message.

A major prediction of the study, which was not supported by the results, was that value-relevance and evidence quality would interact with regard to attitude certainty. One major factor which may have caused an interaction to be less likely was the lack of an initial interaction between value-relevance and evidence quality for certainty. Because certainty was high across all four conditions, an interaction for value-relevance and evidence quality driven by certainty would have been very difficult to produce.

Perhaps most devastating to the predicted results was the apparent lack of efficacy of the evidence quality manipulation. That is, there was no main effect of evidence quality on attitude certainty. Certainty was also well above the midpoint in all four conditions, suggesting that the cues in the poor evidence quality condition (an internet
blog source and a lack of citations for evidence) were not perceived by participants as threatening to the validity of the first message. The high level of certainty found in the low value-relevance, poor evidence quality manipulation, also led to a lack of obtaining the predicted interaction.

However, the significant interaction between value-relevance and evidence quality for thought favorability toward the counterattitudinal message was what one might expect. In the low value-relevance conditions, participants had less negative thoughts toward the counterattitudinal message when their attitudes were based on poor evidence than on good evidence, whereas there was no difference within the high evidence quality condition. This data suggests at least some efficacy for the evidence quality manipulation.

The follow-up analyses of thought favorability and attitude change also suggested an overcorrection for bias while processing the counterattitudinal message, because of the relationship between the active value and the counterattitudinal message. Previous theorizing by Eagly and Chaiken (1995) is also consistent with this explanation for the thought favorability results. These researchers argued that if a value-relevant attitude is resistant to change, that resistance is due to the strength of the cognitive link between a concrete knowledge structure and the more abstract structure of the value. As the structure of the value is more abstract and broad, a persuasive appeal which targets only the knowledge structure will fail to produce change, because of the motivation to uphold the value related to the attitude. What is necessary for change, then, is a persuasive message which attacks the cognitive link between the attitude object and the value (Eagly & Chaiken, 1995). In the present study, the counterattitudinal message strongly
challenged the notion that overhauling the court appointed attorney system was the just thing to do. Further, it is reasonable to assume that the value of justice is related to fair mindedness and bias correction. Thus, a major limitation of the study stemmed from the choice in the value activated.

Viewed another way, the primary problem with the design of the study may have rested with the fact that the counterattitudinal persuasive message also used justice-based counterarguments. During attitude formation, the value of justice aligned with positive attitudes toward the policy change, but during the presentation of the persuasive message the value of justice aligned with negative attitudes. Although resistance to persuasion was not found among the attitude change data, the resistance that actually emerged from the paradigm may have rested with the participants’ values. That is, participants may have showed change in their attitudes in order to maintain the importance of their values. Given that people may be more resistant to changing their values than they are their attitudes, the attitude change data reported here are easier to reconcile with the current and previous attitude certainty findings.

**Future Directions**

The results of the present study offer some insights regarding possible revisions of the methods for a future study testing these same hypotheses. Specifically, the evidence quality manipulation, and the chosen value appear to need revisions.

It seems likely that the evidence quality manipulation did not provide strong enough discounting cues to cause participants in the poor evidence quality conditions to be less confident in the message. Possibly because the blog entry was ostensibly chosen by the experimenters to represent a good message on the issue, the participants were not
concerned with the possibility that the blog was a potentially poor source of information. Furthermore, the message in the blog was clear, well written, and made many plausible claims. Perhaps for a message to be considered poor in terms of evidence quality, it must not provide too much information. In a future study, the message could be shorter and make fewer claims, but still clearly well-supported in the good evidence quality conditions. Also, the value of justice was argued to have possibly caused an overcorrection of bias. In a future study, a value less related to processing objectives could be used to avoid this pitfall.

Finally, it could be the case that a different paradigm would be better for testing hypotheses related to values, biased processing of evidence, and the origins of attitude certainty. For example, rather than employing a value-relevance manipulation designed to get participants to think of a subsequent persuasive message in terms of the value, the value itself could be used as an argument in the study by arguing that the value must be upheld by taking the stance advocated in the message. In this way, the attitude could be thought of as value-based. Perhaps value-based attitudes could be held with certainty without a strong underlying knowledge structure.

**Conclusion**

The present research sought to increase our understanding of the different origins and consequences of attitude certainty. It was hoped that value-relevance could create attitudes held with certainty without a strong knowledge base, in order to show a new process by which attitude certainty can manifest. For research on attitude certainty, this would mean that the view on the antecedents to certainty would have to be broadened, such that thinking about the attitude in terms of important aspects of the self (i.e. values)
would be included. For research on attitudes more generally, the hypothesized results would have provided more evidence that thinking about an attitude object in terms of relevant values can bias that processing. Particularly, the processing would have been biased such that the perception of the quality of the information they have about the attitude object would seem better than it would if values were not as strongly activated. Unfortunately the current paradigm was inadequate to test these hypotheses. However, the results of the current study did provide many clues as to how such a paradigm may be designed such that the hypotheses may be better examined in subsequent studies. The study also provided some insights with regard to possible overcorrection of biases among people who appear to know that their responses to persuasive appeals may be biased by their values.


Appendix A

Evidence Quality Manipulation Screen-Display

Good Evidence Quality

<table>
<thead>
<tr>
<th>SD</th>
<th>Conditional Probability: DS if SD</th>
<th>DS</th>
</tr>
</thead>
<tbody>
<tr>
<td>Appointed</td>
<td>.20</td>
<td>.17</td>
</tr>
<tr>
<td>Mixed/Hired</td>
<td>.17</td>
<td>.08</td>
</tr>
</tbody>
</table>

Notes:
1. Based on models 2A and 2B above (confounders held constant at the mean).

C. USING PREDICTED PROBABILITIES TO EXAMINE THE MAGNITUDE OF POPULATION PARAMETERS

How substantial are the disparities in case outcomes between defendants with appointed counsel and mixed/hired counsel? To provide a more interpretable metric, Table 8 presents predicted probabilities for seek death and death sentence based on models 2A and 2B (confounders held constant at the mean). The predicted probabilities are also used to calculate the conditional probability of jurors rendering a death sentence at trial.13 To illustrate the calculation of conditional probabilities, consider the following example. For defendants with appointed counsel, the predicted probability of the DA seeking death is .20 and the predicted probability of a death sentence is .17. Thus, the conditional probability of jurors rendering a death sentence at trial is: .20x=.17; y=.17/.20; x=.85.

This publication stands in support of the State Congress measures, for several reasons. For far too long, low-income defendants here and elsewhere have been unprotected from shoddy detective work and over eager prosecutors making what should be weak cases implicating defendants in criminal activity (Statzer & Jones, 2001; Wills & Morris, 2005). For example, last year 24.63% of defendants in NC who were assigned a court appointed attorney and convicted, but who won their subsequent appeals with new attorneys, cited flaws in the prosecution’s case, \( \chi^2(1, 345)=40.44 \), \( p < .01 \). Further, the reasons for court appointed attorney’s failures to adequately represent defendants are known (see Gerard & Smith, 2007). According to research funded by Amnesty International (Lee, 2008), court appointed attorneys, in contrast to lawyers from private firms and prosecutor’s offices, often work individually rather than in well managed teams. According to controlled studies (e.g., Abelson, 1999; Katz & Wegener, 2003), teams catch 49.85% more flaws in a prosecutor’s arguments on average (see Ross & Martin’s, 2006 metaanalysis). These results indicate the utility of funding a court appointed attorney system so that the system can be restrucher to give low-income defendants a fair chance.
Poor Evidence Quality

This blog stands in support of State Congress measures, for several reasons. For far too long, low-income defendants here and elsewhere have been unprotected from shoddy detective work and over eager prosecutors making what should be weak cases implicating defendants in criminal activity. For example, last year many defendants in NC who were assigned a court appointed attorney and convicted, but who won their subsequent appeals with new attorneys, cited flaws in the prosecution’s case. Further, the reasons for court appointed attorney’s failures to adequately represent defendants are known. According to a cable television special, court appointed attorneys, in contrast to lawyers from private firms and prosecutor’s offices, often work individually rather than in well managed teams. According to their undercover investigative report, teams with managers are structured in such a way that they can catch more flaws in a prosecutor’s arguments. The solution is clear, fund a court appointed attorney system so that the system can be restructured to give low-income defendants a fair chance.

Sean
Appendix B

Counterattitudinal Message

“As you now know, the Court Appointed Attorney system, in states around the country, has recently come under fire. We would like to share some more information with you which was not presented in the passage presented earlier. First, one recent study by researchers at Oklahoma State argues that there is reason to believe that wrongful conviction numbers are often inflated (Saunders et al., 2007). Second, there are also reasons to believe that the costs of boosting the court appointed attorney system outweigh the possible benefits. For example, according to reports by the National Association of Police Organizations, more well funded court appointed attorneys often spend more time digging for loopholes to get their clients’ cases thrown out (NAPO, 1995, 2001). NAPO argues that under normal circumstances court appointed attorneys spend more effort only on cases for which a legitimate defense can be made. The end result, they say, of increased funding for court appointed attorneys is actually increased crime. In fact, their reports find a correlation between higher funding for court appointed attorneys and crime rates.”
John E. Statzer  
Professional Vitae  
February 2010

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