

A New Look at the Consequences of Attitude Certainty: The Amplification Hypothesis

Joshua J. Clarkson
Indiana University

Zakary L. Tormala
Stanford University

Derek D. Rucker
Northwestern University

It is well established that increasing attitude certainty makes attitudes more resistant to attack and more predictive of behavior. This finding has been interpreted as indicating that attitude certainty crystallizes attitudes, making them more durable and impactful. The current research challenges this crystallization hypothesis and proposes an *amplification hypothesis*, which suggests that instead of invariably strengthening an attitude, attitude certainty amplifies the dominant effect of the attitude on thought, judgment, and behavior. In 3 experiments, the authors test these competing hypotheses by comparing the effects of attitude certainty manipulations on univalent versus ambivalent attitudes. Across experiments, it is demonstrated that increasing attitude certainty strengthens attitudes (e.g., increases their resistance to persuasion) when attitudes are univalent but weakens attitudes (e.g., decreases their resistance to persuasion) when attitudes are ambivalent. These results are consistent with the amplification hypothesis.

Keywords: attitudes, attitude strength, ambivalence, persuasion

People hold their attitudes with varying degrees of conviction. For instance, individuals who have comparable opinions about a political issue might not always view those opinions as equally correct, sports fans who share a favorable attitude toward their team might vary in how valid they perceive that attitude to be, and diners who rate a new restaurant equally favorably might differ in the confidence with which they hold that evaluation. Attitudes researchers have traditionally conceptualized this subjective sense of conviction, correctness, validity, or confidence as *attitude certainty* (Abelson, 1988; Gross, Holtz, & Miller, 1995; Petrocelli, Tormala, & Rucker, 2007), and the construct of attitude certainty has stimulated considerable interest in the attitudes literature (for reviews see Gross et al., 1995; Tormala & Rucker, 2007).

This interest stems, at least in part, from the fact that attitude certainty is thought to have a number of important consequences. The traditional view is that certainty acts as a crystallizing agent, boosting an attitude's durability and impact. Considerable evidence has been mounted in support of this view. Tormala, Clarkson, and Petty (2006), for example, manipulated attitude certainty by giving people false feedback about the strength of the counterarguments they generated while resisting a persuasive appeal.

Tormala et al. (2006) found that as attitude certainty increased, people's attitudes became more predictive of behavioral intentions and more resistant to subsequent attack. This work is compatible with other research linking a heightened sense of certainty to greater attitude-behavior correspondence (Fazio & Zanna, 1978; Glasman & Albarracín, 2006; Tormala & Petty, 2004), greater attitude-choice consistency (Bizer, Tormala, Rucker, & Petty, 2006), greater attitude stability over time (Bassili, 1996), greater resistance to persuasion (Babad, Ariav, Rosen, & Salomon, 1987; Bassili, 1996; Tormala & Petty, 2002; Wu & Shaffer, 1987), and reduced need to acquire or process new information (Maheswaran & Chaiken, 1991). In other words, the crystallization perspective suggests that increasing attitude certainty inherently strengthens an attitude. This has been the dominant, if not only, view of attitude certainty in past research.

In the present research, we challenge the notion that attitude certainty acts only as a crystallizing agent, arguing instead that it functions as an amplifying agent. We propose an *amplification hypothesis* for attitude certainty, suggesting that certainty does not invariably strengthen an attitude but rather that it amplifies the dominant effect of the attitude on thought, judgment, and behavior. If the dominant effect of an attitude is to be resistant to change, for instance, increasing attitude certainty should increase that attitude's resistance, as in past research. If the dominant effect of an attitude is to be susceptible to change, however, the amplification hypothesis proposes that increasing attitude certainty might increase that attitude's susceptibility. Thus, under some conditions, amplification might produce effects that look like attitude crystallization (e.g., increased attitude certainty leading to increased resistance), but under other conditions, amplification would produce effects that directly counter the idea of attitude crystallization (e.g., increased attitude certainty leading to decreased resistance).

Joshua J. Clarkson, Department of Psychological and Brain Sciences, Indiana University; Zakary L. Tormala, Graduate School of Business, Stanford University; Derek D. Rucker, Kellogg School of Management, Northwestern University.

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Correspondence should be addressed to Zakary L. Tormala, Graduate School of Business, Stanford University, 518 Memorial Way, Stanford, CA, 94305. E-mail: tormala_zakary@gsb.stanford.edu

Amplification Versus Crystallization

As suggested above, one way to distinguish the amplification perspective from the crystallization perspective on attitude certainty would be to examine attitudes that differ in their dominant effects on thought, judgment, and behavior. In this research, we focus on the extent to which attitudes are ambivalent, versus univalent, in nature. Past attitude certainty research, which has provided considerable support for the crystallization perspective, has focused primarily on univalent attitudes—that is, attitudes that are mostly positive or negative in valence.¹ It remains unclear from this work what effect attitude certainty might have when attitudes are ambivalent—that is, when attitudes consist of both positive and negative reactions (e.g., thoughts, beliefs, or affect; Priester & Petty, 1996; Thompson, Zanna, & Griffin, 1995).

We submit that the consequences of attitude certainty might vary depending on the univalent versus ambivalent structure of the attitude in question. Indeed, it is well established that univalent and ambivalent attitudes have different dominant effects. For example, compared with univalent attitudes, ambivalent attitudes typically demonstrate weaker attitude–behavior correspondence (e.g., Armitage & Conner, 2000; Costarelli & Colloca, 2004; Dormandy, Hankins, & Marteau, 2006; Glasman & Albarraçin, 2006; Moore, 1973) and greater susceptibility to attack (Armitage & Conner, 2000; Visser & Mirabile, 2004), and they tend to provoke an increased need or desire to obtain and process new information (e.g., Bell & Esses, 2002; Jonas, Diehl, & Brömer, 1997; Maio, Bell, & Esses, 1996; Nordgren, van Harreveld, & van der Pligt, 2006; Petty, Tormala, Briñol, & Jarvis, 2006). The common explanation for these effects has been that people seek to escape from or resolve ambivalence when it exists, so they tend not to follow or cling to ambivalent attitudes when determining behavior or responses to attitude-relevant information.

If certainty amplifies the dominant effect of an attitude, and there is some salient degree of ambivalence underlying that attitude, then gaining attitude certainty has the potential to accentuate ambivalence effects. If true, ambivalent individuals should show less attitude–behavior correspondence, greater susceptibility to attack, and more desire to acquire new information when they hold their attitudes with high, rather than low, certainty. Thus, the amplification hypothesis predicts that the classic strengthening effect of attitude certainty would be confined to situations in which people hold univalent attitudes; when there is salient ambivalence, this effect might be reversed.²

The Certainty–Ambivalence Relation

The present analysis clearly rests on the assumption that attitude certainty and attitude ambivalence can be separated. What is known about the relation between these constructs? As noted already, ambivalence generally exists when global attitudes consist of both positive and negative reactions. Of importance, though, a global attitude that is ambivalent need not be neutral in overall valence. One could hold a relatively positive global attitude, for example, yet still be ambivalent if there is underlying negativity as well or if one simply anticipates negativity (Priester, Petty, & Park, 2007; see also Clark, Wegener, & Fabrigar, 2008). Researchers have distinguished between different types of ambivalence (e.g., objective and subjective ambivalence, Priester & Petty, 1996;

potential and felt ambivalence, Newby-Clark, McGregor, & Zanna, 2002), but an underlying assumption made in some of the work in this domain has been that ambivalence is associated with uncertainty (e.g., Bell & Esses, 2002; Gross et al., 1995; Jonas et al., 1997; Lemon, 1968; Petty et al., 2006). This assumption is based on findings that ambivalence and attitude certainty tend to be negatively correlated (e.g., McGraw, Hasecke, & Conger, 2003; Petrocelli et al., 2007) and that ambivalent attitudes often manifest characteristics similar to attitudes held with low certainty (e.g., character susceptibility to persuasive attack).

Nevertheless, there is reason to believe that attitude certainty and ambivalence are empirically and conceptually distinct. First, factor analyses of attitude strength dimensions suggest that certainty and ambivalence load onto separate factors (e.g., Bassili, 1996). Second, inducing people to think about both sides of an issue has been shown to boost attitude certainty, even though it risks activating a greater degree of conflicting information (Rucker & Petty, 2004; Rucker, Petty, & Briñol, 2008). Third, recent research suggests that variables that influence attitude certainty do not necessarily affect ambivalence (McGraw et al., 2003; Petrocelli et al., 2007). Finally, there are intuitive reasons to view these constructs as distinct. For example, an individual might be highly certain of both the positive (e.g., tastes good) and the negative (e.g., high in calories) features of chocolate, thus feeling certain of his or her ambivalent attitude toward the treat (see also Krosnick & Petty, 1995; Thompson et al., 1995).

Given that attitude certainty and ambivalence appear to be distinct constructs, manipulating them orthogonally permits a test of amplification versus crystallization. Again, both hypotheses predict that increasing certainty will increase attitude strength (i.e., durability and impactfulness; Krosnick & Petty, 1995) when attitudes are univalent. The hypotheses diverge, however, in their predictions for ambivalent attitudes. The crystallization hypothesis suggests that increasing certainty should increase attitude strength for ambivalent attitudes, whereas the amplification hypothesis proposes that increasing certainty should decrease attitude strength for ambivalent attitudes. In the latter case, certainty is thought to act as an amplifier of the dominant effect of the attitude, and the dominant effects of ambivalent attitudes are less durable and less influential over behavior (e.g., Armitage & Conner, 2000).

It is important to highlight that the amplification hypothesis predicts that attitude certainty influences the effect of the attitude, not the attitude itself. In the case of ambivalent attitudes, attitude certainty would be expected to amplify the effect of ambivalence

¹ It should be noted that past studies of attitude certainty have mostly involved bipolar scales when assessing attitudes, leaving the neutral response ambiguous as to whether it represents ambivalence or neutrality (see Cacioppo, Gardner, & Berntson, 1997).

² The amplification hypothesis is distinct from the notion of response amplification proposed by Bell and Esses (2002). Response amplification refers to the idea that when people are ambivalent—and motivated to reduce that ambivalence—their attitudes polarize in the direction of subsequent information (e.g., an ambivalent attitude becomes negative when exposed to negative information). In the present research, we use the term *amplification* to refer to the magnifying impact attitude certainty might have on the dominant effect (e.g., high or low resistance to persuasion) of univalent versus ambivalent attitudes.

without altering the degree of ambivalence. Just as increasing certainty in univalent attitudes does not necessarily increase the extremity of those attitudes (e.g., Rucker & Petty, 2004; Rucker, et al., 2008; Tormala et al., 2006; Tormala & Petty, 2002, 2004), increasing certainty in ambivalent attitudes need not produce greater ambivalence. Being certain of a favorable attitude toward chocolate, for instance, does not necessarily make that attitude more favorable; it makes that favorability more impactful. Similarly, the amplification hypothesis holds that being certain of an ambivalent attitude would not necessarily make that attitude more ambivalent; rather, it would make that ambivalence more impactful.

Note, too, that the amplification hypothesis does not require that under high ambivalence–high certainty conditions, people become more certain of their ambivalence per se (though this could produce similar looking effects). Rather, the hypothesis suggests that when people become more certain of their global attitudes, the effect of this certainty depends on other salient aspects of those attitudes. When ambivalence is salient, ambivalence determines the dominant tendency of the attitude, and certainty amplifies this effect. We address this issue further in the second experiment.

Summary

The primary objective of the present research is to challenge traditional views of what certainty does for (or to) our attitudes. Although researchers have assumed that certainty invariably crystallizes or strengthens an attitude, the amplification hypothesis proposes that certainty amplifies the dominant effect of an attitude on that attitude's strength-related consequences. To test this hypothesis in the present research, we orthogonally manipulate attitude certainty and attitude ambivalence and then test the effects of these manipulations on a series of attitude strength outcomes. Whereas the crystallization hypothesis predicts a main effect of attitude certainty on an attitude's strength-related consequences, the amplification hypothesis predicts an interaction between attitude certainty and ambivalence on these consequences: When an attitude is univalent, increasing certainty should increase attitude strength; when an attitude is ambivalent, increasing certainty should decrease attitude strength.

Experiment 1

The aim in Experiment 1 was to test competing predictions regarding the consequences of attitude certainty when an attitude is ambivalent versus univalent. We used an impression formation paradigm in which participants received consistent or inconsistent evaluative trait descriptions of a target individual. We manipulated certainty by varying the credibility of the source of the trait descriptions. Past research has shown that information from high credibility sources tends to foster greater attitude certainty than does information from low credibility sources (e.g., Rucker & Petty, 2007; Tormala & Petty, 2004). To test the consequences of varying certainty in ambivalent, versus univalent, attitudes, we included a persuasive message after people's initial attitudes had been formed. If attitude certainty invariably crystallizes attitudes, then increasing certainty should produce more resistance (i.e., less change) to the message for both univalent and ambivalent attitudes. If certainty amplifies the dominant effect of the attitude,

however, then increasing certainty should produce more resistance to the message when the attitude is univalent and less resistance to the message when the attitude is ambivalent.

Method

Participants and Design

Ninety-five Indiana University undergraduates participated in partial fulfillment of a requirement for their introductory psychology courses. Participants were randomly assigned to conditions in a 2 (message consistency: consistent or inconsistent) \times 2 (source credibility: high or low) between-participants factorial design.

Procedure

Participants were welcomed by an experimenter and seated at one of seven partitioned computer terminals. The experimenter directed participants to their computer screens where all of the experimental materials were presented. On the opening screen, participants were informed that they would be participating in a study on impression formation. Participants were instructed that they would be given trait descriptions of an undergraduate from their university named Marie, after which they would be asked to rate their impression of her. Participants were led to believe that the trait descriptions they would be reading were generated by acquaintances of Marie. Following this introduction, participants received the trait descriptions. Each description was presented as a separate entry on the same screen. For each entry, a different acquaintance indicated a word that best described Marie. After reading the descriptions, participants reported their ambivalence about Marie, their global attitudes toward her, and their attitude certainty.

Following these measures, participants read a vignette about a recent situation involving Marie that ostensibly was described by one of her current acquaintances. This vignette constituted the persuasive message. To bolster the cover story, we told participants that the incident was recalled during one of our interviews with Marie's acquaintances and that it would be reported in that person's own words. Participants then read the acquaintance's description of a situation involving Marie at a bank. This vignette described Marie in negative terms. For example, according to the acquaintance, Marie became impatient while in line at a bank's drive-through, repeatedly honking her horn, expressing anger at a helpful bank teller, and behaving uncooperatively while the teller cashed Marie's check. Pretests indicated that this message was perceived to be strong and negative. After reading about the event, participants again reported their attitudes toward Marie, after which they were thanked and debriefed.

Independent Variables

Source credibility. We randomly assigned participants to high or low source credibility conditions. This manipulation focused on the length of relationship between the acquaintances and Marie. In the high credibility condition, participants were told that the trait descriptions were gathered from "several individuals who knew Marie for a considerable amount of time before our interview and, therefore, really know her and her traits very well." In the low credibility condition, participants were told that the descriptions

were gathered from “several individuals who knew Marie for a brief amount of time before our interview and, therefore, might not know her and her traits very well.” In both conditions, this information appeared on the screen immediately preceding the trait descriptions. To reinforce the manipulation, each entry included—alongside the trait description—information about how long the acquaintance had known Marie. In the high credibility condition, the length of relationship was described “in the acquaintances’ own words” in relatively long terms (e.g., “3 years,” “5 or 6 years,” “since high school,” “close to 10 years”), whereas in the low credibility condition the length of relationship was described in relatively brief terms (e.g., “5 min,” “About 10 min,” “I just met her,” “A couple of minutes”).

Message consistency. We manipulated the consistency of the initial trait descriptions by varying the valence of the traits presented. We presented all participants with 12 traits. In the consistent condition, all 12 traits were positive (i.e., thoughtful, humorous, cheerful, sincere, dependable, loyal, caring, funny, happy, genuine, reliable, trustworthy). In the inconsistent condition, participants received 6 positive traits (i.e., thoughtful, humorous, cheerful, sincere, dependable, loyal) and 6 negative traits (e.g., selfish, boring, gloomy, hypocritical, unreliable, dishonest). The order of traits was randomized for each condition. To increase the likelihood of participants forming ambivalent attitudes in the inconsistent condition, the 6 negative traits were designed as antonyms of the positive traits. In the consistent condition, the 6 additional positive traits were designed as synonyms of the other positive traits.

Dependent Measures

Attitude ambivalence. Immediately following the initial trait information about Marie, we assessed ambivalence using the method outlined by Priester and Petty (1996). Unlike other indices that assess either objective or subjective ambivalence, this index incorporates both aspects of ambivalence into a global assessment. Computing it involves several steps.

First, we obtained a measure of objective ambivalence by assessing participants’ separate positive and negative evaluations of Marie (Kaplan, 1972; Priester & Petty, 1996; Thompson et al., 1995). We began by assessing positive evaluations: “Considering only your POSITIVE thoughts and feelings about Marie and ignoring the negative ones, how positive would you say your positive thoughts and feelings are?” Responses were provided on a scale ranging from 0 (*no positive thoughts or feelings*) to 10 (*maximum positive thoughts or feelings*). Next we assessed negative evaluations: “Considering only your NEGATIVE thoughts and feelings about Marie and ignoring the positive ones, how negative would you say your negative thoughts and feelings are?” Responses were provided on a scale ranging from 0 (*no negative thoughts or feelings*) to 10 (*maximum negative thoughts or feelings*). We then recoded responses to the positive and negative items as dominant (i.e., the greater of the evaluations) or conflicting (i.e., the lesser of the evaluations). For example, if a participant reported a positive evaluation of 8 and a negative evaluation of 3, then the positive evaluation would be coded as the dominant response and the negative evaluation would be coded as the conflicting response.

Second, we obtained a measure of subjective ambivalence toward Marie using the following item (adapted from Priester & Petty, 1996): “To what extent do you feel undecided about how good or bad Marie is?” Participants responded to this item on a scale ranging from 1 (*not at all*) to 9 (*very much*). Finally, we computed an index of global ambivalence based on the gradual threshold model developed by Priester and Petty (1996). In their model, ambivalence = $5C^p - D^{1/c}$, where D and C are the values for dominant and conflicting responses (with a constant of 1 added to each D and C score), and p is a measure of the association between subjective ambivalence scores and conflicting evaluations.³ Higher values on this index indicate greater ambivalence.⁴

Time 1 attitudes. Following the ambivalence measures, we assessed participants’ global attitudes toward Marie, using a single item: “How much do you think you would like Marie?” Responses were provided on a scale ranging from 1 (*not at all*) to 9 (*very much*).

Attitude certainty. Following the attitude measure, we assessed attitude certainty using a composite of four items adapted from previous research (e.g., Bizer et al., 2006; Krosnick, Boninger, Chuang, Berent, & Carnot, 1993): “How certain are you of your impression of Marie?” “How sure are you that your impression of Marie is right?” “How firm is your impression of Marie?” and “How much confidence do you have in your impression of Marie?” Responses were given on scales ranging from 1 to 9 with the following anchors: *not certain at all–extremely certain*, *not sure at all–extremely sure*, *not firm at all–extremely firm*, and *no confidence at all–very high confidence*. Responses were averaged to form a composite index ($\alpha = .94$), with higher values indicating greater certainty.

Time 2 attitudes and attitude change. After reading about Marie’s incident at the bank, participants again reported their attitudes toward Marie on the same item as before. To create an index of attitude change, we computed the difference between Time 1 attitudes (i.e., attitudes following the initial trait information) and Time 2 attitudes (i.e., attitudes following the description of the bank incident) and coded scores such that higher values indicated more attitude change in the direction of the second message.

Results

Each dependent measure was submitted to a 2×2 analysis of variance (ANOVA) with message consistency (consistent or

³ In essence, p is the slope of the regression line between subjective ambivalence scores and conflicting responses after conducting a log–log transformation on both variables. Because of its dependence on the relationship between subjective ambivalence and objective ambivalence for a given sample, p is not a fixed value. It is calculated uniquely for a given sample, based on the relationship between subjective ambivalence and objective ambivalence. In the three experiments presented here, p equaled .48, .76, and .49, respectively.

⁴ Given our interest in global (i.e., objective and subjective) ambivalence, we used the Priester and Petty (1996) ambivalence index. As noted, though, other ambivalence indices have been used that focus solely on objective ambivalence (e.g., Kaplan, 1972; Thompson et al., 1995). Use of these other indices does not appreciably alter the results of any of the current experiments.

inconsistent) and source credibility (high or low) as the independent variables. Results are presented in the order in which the measures were completed.

Attitude Ambivalence

We began by submitting the ambivalence index to analysis. As expected, there was a significant main effect for message consistency, $F(1, 91) = 114.04, p < .0001$, such that ambivalence was greater in the inconsistent ($M = 9.25, SD = 1.88$) condition than in the consistent ($M = -0.29, SD = 5.75$), condition. No other effects were significant ($ps > .21$).

Time 1 Attitudes

Analysis of the Time 1 attitude data revealed an expected main effect for message consistency, $F(1, 91) = 59.02, p < .0001$. Attitudes were significantly more favorable in the consistent condition ($M = 5.92, SD = 1.09$), where only positive traits were presented, than in the inconsistent condition ($M = 4.22, SD = 1.02$), where both positive and negative traits were presented. No other effects were significant ($ps > .25$).

Attitude Certainty

Unlike the ambivalence and attitude data, the attitude certainty data revealed a significant effect of source credibility, $F(1, 91) = 3.87, p = .05$; participants reported greater attitude certainty in the high ($M = 5.09, SD = 1.88$) credibility condition than in the low ($M = 4.26, SD = 2.13$) credibility condition. There was also a main effect for message consistency, $F(1, 91) = 23.65, p < .0001$, such that participants in the consistent condition ($M = 5.51, SD = 2.06$) reported more attitude certainty than did participants in the inconsistent condition ($M = 3.70, SD = 1.58$). The interaction was not significant ($p > .22$).

Attitude Change

Finally, we submitted the attitude change data to analysis (see Figure 1). First, there was an unanticipated main effect for message consistency, $F(1, 91) = 6.98, p = .01$, such that more attitude change was evident in the consistent ($M = 2.56, SD = 1.31$) condition than in the inconsistent ($M = 1.80, SD = 1.36$) condition. There was no main effect for credibility ($F < 1$). Of greatest import, we obtained the predicted Credibility \times Consistency interaction, $F(1, 91) = 9.70, p < .01$. In the consistent condition, in which ambivalence was low, greater attitude change occurred in the low ($M = 2.96, SD = 0.25$) credibility condition than in the high ($M = 2.13, SD = 0.26$) credibility condition, $F(1, 91) = 5.32, p = .02$, following the traditional pattern based on the attitude certainty outcome. In the inconsistent condition, in which ambivalence was high, this effect was reversed—that is, greater attitude change occurred in the high ($M = 2.25, SD = 0.29$) credibility condition than in the low ($M = 1.44, SD = 0.26$) credibility condition, $F(1, 91) = 4.44, p < .04$.⁵

Discussion

In Experiment 1, we used an impression formation paradigm to create univalent or ambivalent attitudes by exposing participants to

consistent or inconsistent evaluative information. Furthermore, we induced high or low attitude certainty by varying the credibility of the source of the information. To examine the consequences of being more or less certain of an ambivalent, versus univalent, attitude, we presented participants with a persuasive message after their initial attitudes had been formed. The attitude change results were consistent with the amplification hypothesis. That is, we replicated the traditional effect of attitude certainty on resistance—less change following greater certainty—when attitudes were univalent, but we significantly reversed this effect when attitudes were ambivalent.

This reversal under ambivalent attitude conditions is particularly important to the present concerns. In fact, it is interesting to note that participants in the inconsistent message–low credibility condition displayed the least attitude change, despite the fact that by conventional standards they should have had the weakest attitudes, because they had both high ambivalence and low certainty. Just as high certainty was associated with substantial attitude change among ambivalent individuals, then, low certainty was associated with relative resistance among these individuals. This result poses a challenge to the traditional view of attitude certainty as an inherently crystallizing agent. Again, ambivalent attitudes generally demonstrate heightened susceptibility to persuasion, and high (low) certainty increased (decreased) this susceptibility.

Several additional features of Experiment 1 are worth noting. First, whereas the credibility manipulation affected only attitude certainty, the message consistency manipulation affected both attitude certainty and attitude ambivalence. We assume the primary effect of message consistency was on ambivalence, but that attitude certainty was influenced in a secondary fashion due to its modest association with ambivalence ($r = .49, p < .001$). To test this assumption, we submitted each index to an analysis of covariance (ANCOVA) with message consistency as the independent variable and the other index as a covariate. Controlling for certainty, the effect of message consistency on ambivalence remained significant, $F(1, 92) = 74.67, p < .0001$. Controlling for ambivalence, however, the effect of message consistency on attitude certainty was no longer significant, $F(1, 92) = 1.67, p > .20$. Thus, the primary effect of message consistency appeared to be on ambivalence. This finding, in combination with the fact that the credibility manipulation affected only attitude certainty, provides further evidence for the conceptual and empirical distinction between certainty and ambivalence. Although there can be some association between these constructs, they also operate independently and respond differently to different manipulations.

It is also interesting that in general, participants in the consistent message condition showed greater attitude change than did participants in the inconsistent message condition. Although we did not anticipate this main effect, we suspect that it was a statistical artifact of differences in the possible range of scores. That is,

⁵ We examined attitude change scores because postmessage–premessage differences in attitudes provide intuitive and straightforward indices of persuasion. Of importance, however, we also analyzed the effects of credibility on Time 2 attitudes, treating Time 1 attitudes as a covariate. Controlling for Time 1 attitudes, there was a significant interaction, $F(1, 91) = 5.37, p = .02$, in the same form as described for the attitude change index.

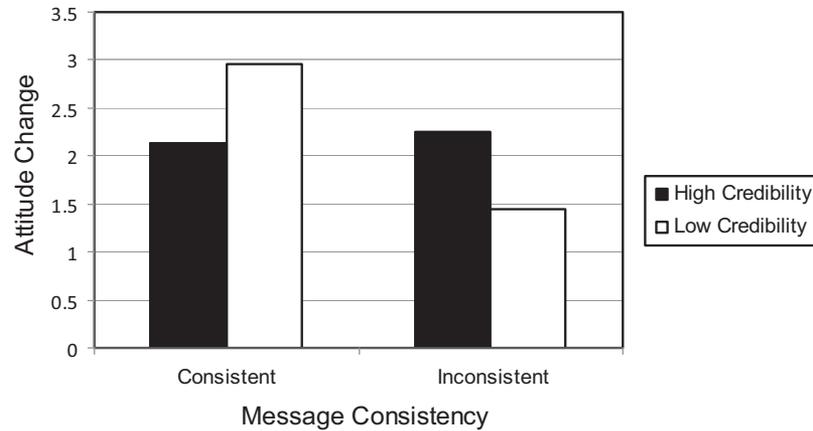


Figure 1. Attitude change as a function of message consistency and source credibility in Experiment 1. Scores are coded such that greater values indicate greater change in the direction of the second message.

initial attitudes were more positive in the univalent condition than in the ambivalent condition, which created more room to change toward the negative follow-up message. Most germane to our concerns, however, the relative differences in attitude change were present within each message condition, and they assumed the predicted form.

Finally, the interaction on attitude change was important in suggesting that change did not stem from differential perceptions of the second source—that is, the acquaintance who described Marie's behavior at the bank. On the basis of the results from the univalent condition alone, for example, it could be argued that greater attitude change under low credibility conditions stemmed from people viewing the source of the second message as more credible—perhaps due to a contrast effect with the credibility of the prior source. Recent research has shown that features of persuasive messages, such as source credibility, can be subject to context effects when multiple messages are presented in sequence (Tormala & Clarkson, 2007, 2008; Tormala & Petty, 2007). We think a source contrast account of the current results is untenable, however, as it would suggest that participants should be more persuaded by the second message following an initial message from a low credibility source, regardless of their level of ambivalence. The interaction between source credibility and message consistency on attitude change is incompatible with this account.

Experiment 2

Experiment 2 was designed to replicate and extend the results of Experiment 1. The procedure was conceptually similar to that of Experiment 1, but we made several modifications to enhance the generalizability of the findings. First, we moved away from the impression formation paradigm and instead presented participants with consistent or inconsistent evaluative information about a department store. Second, to establish that the attitude change effects in Experiment 1 were not dependent on the (negative) valence of the persuasive attack, we presented all participants in Experiment 2 with a persuasive message at the end of the study that was positive in valence. To accommodate this change, participants in the univalent attitude condition received initial negative information about the department store. Also important, we altered

the manipulation of source credibility (i.e., attitude certainty); participants in this experiment were led to believe the information about the department store came from a consumer magazine that was high or low in credibility. Finally, we included additional items to assess the perceived credibility of the source of the initial information. To permit a test of whether initial source perceptions remained intact even after the subsequent information was received (i.e., the second message), we asked participants to rate the first source's credibility at the very end of the experiment.

In addition to these modifications, we included a new dependent measure to address an important theoretical question. As described already, the amplification hypothesis holds that attitude certainty, defined as the conviction with which one holds one's global summary attitude, can have different consequences depending on the dominant effects, or natural tendencies, of the attitude in question. Most interesting, when the attitude's dominant effect is to change in the face of new information, the amplification hypothesis predicts that gaining certainty will accentuate this change. In the current research, we examine ambivalence as one factor that determines an attitude's dominant effects.

On the basis of the findings of Experiment 1, however, one might argue that our attitude certainty manipulation really influenced participants' ambivalence certainty—that is, their certainty about their own ambivalence. To make it clear that we were assessing attitude certainty and not ambivalence certainty, we placed the certainty measure directly after the global attitude rating, and the certainty items explicitly referred to participants' global attitudes rather than their ambivalence. Nevertheless, it is possible that these items masked or picked up on some degree of ambivalence certainty. If true, one might predict the same pattern of effects as those observed—in particular, more (less) attitude change when people were more (less) certain of their ambivalence—but the implication would be less that attitude certainty effects can be reversed and more that certainty can be attached to numerous attitudinal assessments. It is unclear that the ambivalence certainty account would apply to the univalent condition, in which increased certainty led to increased resistance, but perhaps one could argue that participants construed the certainty items differently across conditions, viewing them as attitude certainty

items in the univalent condition and as ambivalence certainty items in the ambivalent condition.

Regardless, this issue is important to address, as our hypothesis is that when people become more certain of their global attitudes, the effect of this certainty depends on other salient aspects of those attitudes. When ambivalence is salient, ambivalence determines the dominant tendency of the attitude, and certainty amplifies this effect. But people need not be certain of their ambivalence per se. To address this issue in Experiment 2, we included a measure of ambivalence certainty. We expected our manipulation of source credibility to affect attitude certainty but not ambivalence certainty.

Method

Participants and Design

Sixty-two Indiana University undergraduates participated in partial fulfillment of a requirement for their introductory psychology courses. Participants were randomly assigned to conditions in a 2 (message consistency: consistent or inconsistent) \times 2 (source credibility: high or low) between-participants factorial design.

Procedure

As in Experiment 1, all experimental sessions were conducted on computer. On the opening screen, participants were led to believe that this study represented a joint effort between the psychology department and the business school to assess community reactions to a new department store coming to the area. Participants were told that they would be presented with information about this store, after which we would assess their thoughts and reactions. Following this introduction, we presented participants with information about Townsend's department store. We led participants to believe that Townsend's was a national retail chain consisting of several departments, each of which had its own departmental manager and policies. Because each department was managed separately, the policies and procedures varied from one department to another. Participants were told that to assess their reactions to Townsend's we would be presenting them with information about two different departments: the music department and the camera department.

We then presented participants with a message that included background information about the Townsend's retail chain as well as information about both the music and camera departments. The consistency of the information about the two departments was varied to induce either ambivalent or univalent attitudes toward Townsend's. Immediately following the message, participants reported their ambivalence, global attitudes, attitude certainty, and ambivalence certainty.

After completing these measures, participants were presented with additional information about one of the departments (the camera department) that had ostensibly been collected by an independent research agency. The information provided in this second message was positive across all conditions (e.g., the camera department ensures that employees know the details about the products they offer, provides a strong warranty plan, and accepts returns on most items). These positive arguments pretested as relatively strong. Following the second message, which constituted the persuasive attack, participants again reported their attitudes

toward Townsend's before responding to several items concerning their perception of the credibility of the initial source. Participants were then debriefed and thanked for their participation.

Independent Variables

Source credibility manipulation. Before participants received the initial message about Townsend's, they were randomly assigned to the high source credibility condition or the low source credibility condition. In the high credibility condition, participants were told the following:

The following information about Townsend's department store comes from a recent article in *Consumer Reports*. *Consumer Reports* is a monthly magazine published by a nonprofit organization. It is worth noting that *Consumer Reports'* tests and ratings of appliances, automobiles, retailers, and other products/services are widely respected. That is, their tests and ratings tend to be consistent with the tests and ratings of other reputable agencies. In a recent survey, 92% of Townsend's department store customers agreed with the information in this article.

In the low credibility condition, participants received different information:

The following information about Townsend's department store comes from a recent article in *Consumers Digest*. *Consumers Digest* is a monthly magazine published by a for-profit organization. It is worth noting that *Consumers Digest's* tests and ratings of appliances, automobiles, retailers, and other products/services are not widely respected. That is, their tests and ratings tend to be inconsistent with the tests and ratings of reputable agencies. In a recent survey, only 54% of Townsend's department store customers agreed with the information in this article.

This manipulation was adapted from similar manipulations in past research (e.g., Briñol, Petty, & Tormala, 2004).

Message consistency. Following the credibility information, participants received either consistent or inconsistent initial information about Townsend's department store. In both conditions, participants received information about two different departments: the music department and the camera department. In the inconsistent message condition, we gave participants positive information about the music department (e.g., the department hires an experienced staff, carries a wide selection of brands, maintains competitive prices, and has a very high consumer rating) and negative information about the camera department (e.g., the department offers unreliable portrait work, carries outdated products, is unable to develop film onsite, and has a very low consumer rating). In the consistent message condition, we provided negative information about both departments.

Dependent Measures

Attitude ambivalence. Participants reported their ambivalence on the same items as in Experiment 1, but the items were framed in terms of Townsend's department store. A global ambivalence index was computed with the same procedure, with higher values indicating more ambivalence.

Time 1 attitudes. Following the ambivalence items, participants reported global attitudes toward Townsend's on a single semantic differential scale ranging from 1 (*bad*) to 9 (*good*).

Attitude certainty. After the attitude measure, we assessed attitude certainty using a single global item adapted from past research (e.g., Fazio & Zanna, 1978; Tormala & Petty, 2002): “How certain are you of your attitude toward Townsend’s?” Participants responded to this question on a scale ranging from 1 (*not certain at all*) to 9 (*extremely certain*).

Ambivalence certainty. After the attitude certainty measure, we assessed ambivalence certainty. This item read as follows: “A moment ago you rated how undecided you were about how good or bad Townsend’s department store is. How certain are you of your rating?” Responses were provided on a scale ranging from 1 (*not certain at all*) to 9 (*extremely certain*).

Time 2 attitudes and attitude change. Following the second message about Townsend’s camera department, participants again reported their attitudes toward Townsend’s on the same item as before (i.e., the *bad–good* semantic differential). To create an index of attitude change in response to the second message, we subtracted Time 1 attitudes (i.e., attitudes following the initial message) from Time 2 attitudes (i.e., attitudes following the second message). Higher values indicated greater attitude change in the direction of the second message.

Initial source credibility. Finally, we assessed perceptions of the initial source, using items adapted from past research (e.g., Tormala & Clarkson, 2007). Leading into this measure, participants were reminded that earlier they had been presented with information about Townsend’s department store from a consumer magazine. They were then asked the following three items: “How credible is that consumer magazine?” “How reliable is that consumer magazine?” and “How knowledgeable is that consumer magazine?” Responses were given on scales ranging from 1 to 9 with the following anchors: *not credible at all–very credible*, *not reliable at all–very reliable*, and *not knowledgeable at all–very knowledgeable*. Responses were averaged to form a composite index ($\alpha = .96$), with higher values indicating greater perceived credibility.

Results

As in Experiment 1, each dependent measure was submitted to a 2×2 ANOVA with message consistency (consistent or inconsistent) and source credibility (high or low) as the independent variables. Results are presented in the order in which the measures were completed.

Attitude Ambivalence

We began by submitting the ambivalence index to analysis. As expected, there was a significant main effect for message consistency, $F(1, 58) = 5.44, p < .03$, such that ambivalence was greater in the inconsistent ($M = 13.86, SD = 5.16$) message condition than in the consistent ($M = 10.55, SD = 4.99$) message condition. No other effects were significant ($ps > .16$).

Time 1 Attitudes

The attitude data also showed a main effect for message consistency, $F(1, 58) = 10.05, p < .01$. Attitudes were less favorable

in the consistent message condition ($M = 3.93, SD = 1.44$), in which only negative information was presented, than in the inconsistent message condition ($M = 5.28, SD = 1.37$), in which both positive and negative information was presented. There was also a marginal main effect of source credibility, $F(1, 58) = 3.69, p = .06$, such that Time 1 attitudes were more favorable in the high ($M = 5.13, SD = 1.48$) credibility condition than in the low ($M = 4.10, SD = 1.47$) credibility condition. The interaction was not significant ($p > .26$).

Attitude Certainty

The attitude certainty data revealed a main effect of source credibility, $F(1, 58) = 3.83, p = .05$; participants reported greater attitude certainty in the high credibility condition ($M = 5.75, SD = 1.69$) than in the low ($M = 4.83, SD = 1.46$) credibility condition. No other effects were significant ($F_s < 1$).

Ambivalence Certainty

Analysis of the ambivalence certainty data revealed no significant effects ($ps > .15$).

Attitude Change

The attitude change data are presented in Figure 2. As in Experiment 1, there was a main effect for message consistency, $F(1, 58) = 5.55, p = .02$, with more attitude change evident in the consistent condition ($M = 1.63, SD = 1.38$) than in the inconsistent ($M = 0.88, SD = 1.21$) condition, but there was no main effect for source credibility ($F < 1$). Again, we attribute the message consistency effect to a difference in the possible range of scores based on Time 1 attitudes. Most germane to our primary concerns, we obtained the predicted Source Credibility \times Message Consistency interaction, $F(1, 58) = 8.65, p < .01$. In the consistent message condition, in which ambivalence was low, greater attitude change occurred in the low ($M = 2.00, SD = 1.37$) credibility condition than in the high ($M = 1.00, SD = 1.18$) credibility condition, $F(1, 58) = 4.62, p < .04$. In the inconsistent message condition, in which ambivalence was high, this effect was significantly reversed—that is, greater attitude change occurred in the high ($M = 1.19, SD = 1.25$) credibility condition than in the low ($M = 0.27, SD = 0.90$) credibility condition, $F(1, 58) = 4.03, p < .05$.⁶

Initial Source Credibility

Finally, we examined perceptions of the initial source’s credibility. As intended, there was a significant main effect of source credibility, $F(1, 58) = 33.66, p < .001$, such that participants perceived the high credibility source as more credible ($M = 6.23, SD = 1.86$) than the low credibility source ($M = 3.48, SD = 1.56$). No other effects approached significance ($ps > .28$).

⁶ As in Experiment 1, we also analyzed Time 2 attitudes, with Time 1 attitudes as a covariate. This analysis produced a significant interaction, $F(1, 57) = 7.49, p < .01$, in the same pattern as described for the attitude change index.

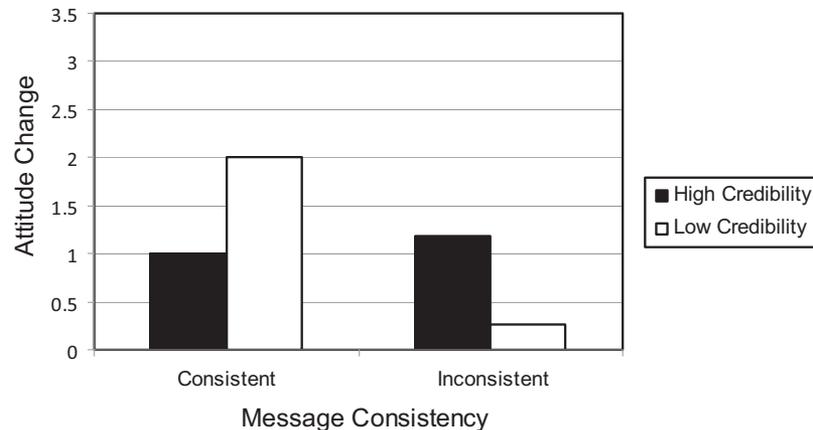


Figure 2. Attitude change as a function of message consistency and source credibility in Experiment 2. Scores are coded such that greater values indicate greater change in the direction of the second message.

Discussion

Experiment 2 replicated the key findings from Experiment 1, despite numerous procedural changes. In particular, we switched from an impression formation paradigm to a more classic persuasion paradigm, we altered the valence of the persuasive message participants received after forming their initial attitudes, and we changed the manipulation of the source credibility. Nevertheless, we obtained the predicted interaction between message consistency and source credibility on attitude change: Participants with low ambivalence were more resistant to persuasion when they had high, compared with low, attitude certainty, whereas participants with high ambivalence were more resistant when they had low, compared with high, attitude certainty.

In addition to replicating the amplification effect from Experiment 1 in a new paradigm, Experiment 2 further clarified the nature of this effect. For example, an important question after Experiment 1 was whether our source credibility manipulation affected attitude certainty, as we proposed, or ambivalence certainty—that is, the level of certainty participants had about their ambivalence per se. We explored this issue in Experiment 2 by measuring both forms of certainty. The results indicated that source credibility affected attitude certainty but did not affect ambivalence certainty. Thus, we found no evidence to support the notion that ambivalence certainty was responsible for the amplification effects we observed. Instead, it appears that attitude certainty amplifies the dominant effect of the attitude, as predicted.

Experiment 2 also was useful in that it included several new items after the second message, assessing participants' perceptions of the source of the first message. These measures showed a main effect of source credibility, suggesting that participants did not reinterpret or reevaluate the first source after receiving the second set of contradictory information. Therefore, shifting source perceptions cannot account for the attitude change effects.

One argument that might be raised with respect to Experiment 2 is that although we hypothesize that people can hold ambivalent attitudes with high certainty, our paradigm actually shows people becoming more or less certain of separate positive and negative evaluations of two different attitude objects (i.e., the music department and the camera department) without synthesizing these as-

sessments into global attitude certainty. Though this possibility has some intuitive appeal, it is not supported by the data. For example, if participants in the ambivalent condition of Experiment 2 simply became more certain of their separate positive and negative evaluations of each department and did not consolidate those assessments, they should have been more resistant to a persuasive attack on one of the departments when they had high, as opposed to low, certainty. A considerable body of past research would predict this outcome (see Tormala & Rucker, 2007). Yet the attitude change data showed the exact opposite pattern. Thus, the attitude change results were incompatible with this alternative account. In addition to the attitude change evidence, features of our experimental design render this alternative account implausible. In Experiment 1, for example, the conflicting information in the ambivalence condition unambiguously referred to a single attitude object (i.e., Marie). Moreover, our dependent measures in both studies have explicitly directed participants to consider their global, or general, assessments of the attitude object. Taken together, then, our first two experiments provide numerous arguments against the dual-evaluation certainty view of our findings.

Finally, it is worth noting that the mean ambivalence score in the consistent message (i.e., univalent) condition was greater in Experiment 2 than in Experiment 1. We assume this difference was fostered by the paradigms we used. In Experiment 1, participants in the consistent message condition received 12 positive trait descriptions of the exact same target person, half of which were synonyms. In Experiment 2, participants in the consistent message condition received congruent evaluative descriptions of two different departments within a store. Although both conditions produced less ambivalence than did their inconsistent message counterparts, the latter might have been more amenable than was the former to participants experiencing some degree of ambivalence. The important outcome from our point of view was that the low ambivalence conditions within each experiment elicited the traditional effects of attitude certainty. Therefore, even though the mean ambivalence score in the univalent condition was higher in Experiment 2 than Experiment 1, participants in that condition still appeared to be below some subjective threshold, which led them to respond differently, compared with participants who were above

that threshold (i.e., those in the ambivalent condition). The key, then, was what the relative difference across conditions was and whether this difference placed people above or below their personal thresholds (Priester & Petty, 1996).

Experiment 3

In Experiment 3, we had two objectives. Our central aim was to examine the nature of the attitude change effects revealed in the first two experiments. Specifically, we investigated whether the attitude change effects we uncovered are thoughtful or non-thoughtful in nature. One possibility is that heightened susceptibility to attitude change in the low ambivalence–low certainty and high ambivalence–high certainty conditions reflects a general motivation to latch onto any new information in a relatively thoughtless manner. Alternatively, it could be that heightened susceptibility to attitude change under these conditions reflects an increased motivation to acquire and examine new information, which would be more thoughtful in nature. Both of these accounts would be compatible with the amplification perspective as ambivalence has previously been linked with both general susceptibility to persuasion (e.g., Armitage & Conner, 2000; Bell & Esses, 2002) and increased motivation to thoughtfully process new information (e.g., Clark et al., 2008; Maio et al., 1996; Petty et al., 2006), but these accounts lend themselves to different interpretations of the attitude change effects and different expectations for moderators of these effects.

One way to tease apart the two accounts would be to manipulate the quality of arguments in the persuasive attack. Discriminating between strong persuasive arguments and weak persuasive arguments is a well-documented consequence of thoughtful processing, such that people tend to be more persuaded by strong arguments than by weak arguments when they process deeply, but less so when they process superficially (e.g., Petty & Cacioppo, 1986). Thus, if the attitude change we have observed in Experiments 1 and 2 is thoughtful in nature, we would expect participants in the low ambivalence–low certainty and high ambivalence–high certainty conditions to show more persuasion in response to strong arguments than in response to weak arguments in a follow-up attack. If, on the other hand, the attitude change effects are nonthoughtful in nature, we would expect participants in these conditions to show equivalent persuasion, regardless of argument quality.

As a secondary goal, we sought to test the implications of attitude certainty for an attitude's tendency to predict behavior. As reviewed already, considerable research has demonstrated that high certainty attitudes are more predictive of behavior than are low certainty attitudes (e.g., Bizer et al., 2006; Fazio & Zanna, 1978; Tormala & Petty, 2002). Given the present work, however, it stands to reason that greater certainty might decrease the predictive utility of an ambivalent attitude, in accord with the notion that certainty amplifies the known consequences of attitude, and ambivalent attitudes have been shown to evince reduced attitude–behavior correspondence (e.g., Armitage & Conner, 2000).

To explore these issues, we retained the paradigm from Experiment 2 involving Townsend's department store but modified several aspects of the procedure. First, we altered our manipulation of attitude certainty. In this study, we primed participants with confidence or doubt, using a manipulation adapted from recent

research (Petty, Briñol, & Tormala, 2002; Tormala, Rucker, & Seger, 2008). Because feeling confident, versus doubtful, has been shown to affect information processing activity (e.g., J. A. Edwards, 2003; Tormala et al., 2008), we primed participants after they were exposed to the initial persuasive message, reducing the risk of creating differential processing of the initial information. Second, to test the effects of certainty on attitude–behavior correspondence, we included a behavioral intentions measure along with our measures of ambivalence, attitudes, and attitude certainty, following the first message about Townsend's. Behavioral intentions have been shown to be effective predictors of actual behavior in past research (e.g., Fishbein & Ajzen, 1975). Finally, we varied the quality of arguments in the follow-up persuasive attack to assess the thoughtful, versus nonthoughtful, nature of the attitude change effects.

Method

Participants and Design

Ninety-nine Indiana University undergraduates participated in partial fulfillment of a requirement for their introductory psychology courses. Participants were randomly assigned to conditions in a 2 (message consistency: consistent or inconsistent) \times 2 (prime: confidence or doubt) \times 2 (subsequent argument quality: strong or weak) between-participants factorial design.

Procedure

As noted, this experiment was similar to Experiment 2, but there were a few key modifications. As in Experiment 2, participants were presented with an initial message about Townsend's department store, and this message varied in its evaluative consistency. Following this message, participants completed a task designed to manipulate attitude certainty. Instead of using a credibility manipulation, as in Experiments 1 and 2, we primed participants with either confidence or doubt. After the prime, participants completed several dependent measures, including an index of behavioral intentions. Finally, whereas in Experiments 1 and 2 we presented all participants with a strong follow-up persuasive message, in this experiment we varied the strength of the message.

Independent Variables

Message consistency. Participants were randomly assigned to receive either consistent initial information or inconsistent initial information about Townsend's department store. This manipulation was identical to Experiment 2.

Prime. After reading the initial message about Townsend's, but before completing any dependent measures, participants were randomly assigned to one of two priming conditions designed to induce either confidence or doubt (adapted from Tormala et al., 2008). Consistent with the cover story regarding our interest in gauging consumer responses, participants were told that they would be completing a brief autobiographical memory task to help us better understand the role that memory plays in consumer decision making. This task consisted of participants recalling five personal experiences in which they felt either confident or doubtful. The instructions were as follows (manipulated words are in parentheses):

We would like you to list five experiences you have had in which you felt a great deal of confidence or certainty (doubt or uncertainty). These experiences could reflect confidence (doubt) in thoughts you have had, confidence (doubt) in decisions or predictions you've made, or even confidence (doubt) in your general ability to do something. In each of the five boxes that appear on the next several screens, please describe a different experience in which you felt highly confident (doubtful) about something.

Following these instructions, participants recorded their experiences by typing them into a series of boxes that appeared one at a time on the computer screen. Again, this manipulation followed the initial message about Townsend's to avoid inducing differential processing of that message.

Argument quality. In the initial message about Townsend's, all participants received negative information about the camera department. At the end of the experiment, participants were randomly assigned to receive either strong or weak arguments in favor of the camera department. In the strong argument condition, participants received the same strong arguments as in Experiment 2. In the weak argument condition, participants received a series of less compelling arguments in favor of the camera department (e.g., employees are required to know a minimal amount of the details about the products they offer before they work in the department, the department provides a limited warranty plan, and the department accepts returns on some of the inexpensive items). These arguments were established in pretesting as relatively weak.

Dependent Measures

Attitude ambivalence. Immediately following the prime manipulation, participants reported their ambivalence about Townsend's on the same items as in Experiment 2. A global ambivalence index was computed with the same procedure as before. Higher values indicated greater ambivalence.

Time 1 attitudes. After recording ambivalence, we assessed participants' attitudes toward Townsend's on a series of semantic differential scales ranging from 1 to 9, with the following anchors: *negative-positive*, *bad-good*, *against-in favor*, *foolish-wise*. Responses to these items were averaged to form a composite attitude index ($\alpha = .92$). Higher scores indicated more favorable attitudes toward Townsend's.

Attitude certainty. Next, participants reported attitude certainty on a single global item (adapted from Tormala et al., 2006): "How convinced are you of your attitude toward Townsend's?" Participants responded on a scale ranging from 1 (*not convinced at all*) to 9 (*extremely convinced*).

Behavioral intentions. After the certainty measure, we assessed behavioral intentions. Specifically, we asked participants to rate the likelihood that they would shop at Townsend's if the department store came to town. Participants responded to this question on a scale ranging from 1 (*not likely at all*) to 7 (*very likely*).

Time 2 attitudes. Following the second message about Townsend's (i.e., the positive information about the camera department), participants again reported their attitudes toward Townsend's on the same semantic differential scales as at Time 1 ($\alpha = .97$).

Results

Because the argument quality manipulation followed all measures except Time 2 attitudes, we began by submitting each of the dependent measures to a 2×2 ANOVA with message consistency (consistent or inconsistent) and prime (confidence or doubt) as the independent variables. Results are presented in the order in which these measures appeared.

Attitude Ambivalence

On the ambivalence index, we obtained the expected main effect for message consistency, $F(1, 95) = 6.45, p = .01$; ambivalence was greater in the inconsistent ($M = 8.97, SD = 3.00$) message condition than in the consistent ($M = 7.16, SD = 3.90$) message condition. There was no effect of prime, $F(1, 95) = 3.06, p < .09$, and no interaction, $F(1, 95) = 1.56, p > .21$.

Time 1 Attitudes

The attitude data also showed a main effect for message consistency, $F(1, 95) = 70.05, p < .0001$. Attitudes were less favorable in the consistent message condition ($M = 3.54, SD = 1.44$), in which only negative information was presented, than in the inconsistent message condition ($M = 5.51, SD = 0.78$), in which both positive and negative information was presented. There was no main effect for prime ($F < 1$), and no interaction, $F(1, 95) = 3.32, p < .07$.

Attitude Certainty

We next submitted the attitude certainty data to analysis. As expected, there was a significant main effect of prime, $F(1, 95) = 4.25, p < .05$; participants in the confidence prime condition ($M = 6.10, SD = 1.63$) reported more certainty than did participants in the doubt prime condition ($M = 5.35, SD = 1.91$). Neither the main effect for message consistency, $F(1, 95) = 3.18, p < .08$, nor the interaction ($F < 1$), were significant.

Behavioral Intentions

On the behavioral intentions index, there was a significant main effect of message consistency, $F(1, 95) = 15.37, p < .001$. Overall, participants were more likely to shop at Townsend's after receiving inconsistent ($M = 3.68, SD = 1.71$) information than after receiving consistent negative ($M = 2.46, SD = 1.43$) information about the store. No other effects were significant ($ps > .22$). Also important was the pattern of attitude-behavioral intention correspondence across conditions. For this analysis, we examined the simple correlations between Time 1 attitudes and behavioral intentions. Replicating past research, in the consistent message (i.e., low ambivalence) condition, attitude-intention correspondence tended to be greater after the confidence prime ($r = .61, p = .001$) than after the doubt prime ($r = .40, p < .05$). In accord with the amplification hypothesis, however, this pattern reversed in the inconsistent message (i.e., high ambivalence) condition. In this case, attitude-intention correspondence tended to be

greater in the doubt prime condition ($r = .42, p < .05$) than in the confidence prime condition ($r = .23, p > .28$).⁷

Time 2 Attitudes

Most germane to our primary concerns, we submitted the Time 2 attitude data to a $2 \times 2 \times 2$ ANOVA with message consistency (consistent or inconsistent), prime (confidence or doubt), and argument quality (strong or weak) as the independent variables. This analysis uncovered three main effects: a main effect of argument quality, $F(1, 91) = 61.54, p < .0001$, such that participants reported more favorable attitudes when presented with the strong ($M = 5.69, SD = 1.31$) message than when presented with the weak ($M = 3.72, SD = 1.33$) message; a main effect of message consistency, $F(1, 91) = 5.04, p < .03$, such that participants reported more favorable attitudes when first exposed to the inconsistent ($M = 5.10, SD = 1.60$) message than when first exposed to the consistent ($M = 4.40, SD = 1.62$) message; and a main effect of prime, $F(1, 91) = 9.38, p < .003$, such that participants reported more favorable attitudes when primed with doubt ($M = 5.10, SD = 1.41$) than when primed with confidence ($M = 4.37, SD = 1.78$). These effects suggest that in general, participants were more persuaded by the second message when it was strong and when their initial attitudes were more ambivalent or held with greater doubt.

However, these effects were qualified by a three-way interaction among message consistency, prime, and argument quality, $F(1, 91) = 8.33, p < .01$. As depicted in Figure 3, this three-way interaction involved two opposing two-way interactions. For individuals in the consistent message condition (low ambivalence),

there was a Prime \times Argument Quality interaction, $F(1, 48) = 4.53, p < .04$, indicating a significant argument quality effect in the doubt prime condition, $F(1, 48) = 18.51, p < .0001$, but not the confidence prime condition, $F(1, 48) = 1.88, p > .17$. For individuals in the inconsistent message condition (high ambivalence), this pattern was reversed. That is, there was a Prime \times Argument Quality interaction, $F(1, 43) = 3.96, p = .05$, suggesting that argument quality had a greater impact on attitudes in the confidence prime condition, $F(1, 43) = 42.15, p < .0001$, than in the doubt prime condition, $F(1, 43) = 15.32, p < .0001$, though the simple effects reached significance in both cases.⁸

Discussion

Experiment 3 extended the findings of the first two experiments. Most important, Experiment 3 expanded our understanding of the attitude change effects observed in the first two experiments. Specifically, we manipulated the quality of arguments contained in the second message to determine whether the attitude change effects were thoughtful or nonthoughtful in nature. We found that greater attitude certainty was associated with reduced argument quality effects when ambivalence was low but was associated with increased argument quality effects when ambivalence was high. This finding indicates that the attitude change observed in Experiments 1 and 2 likely involved thoughtful processing. Feeling certain of an ambivalent attitude, or uncertain of a univalent attitude, did not lead participants to latch onto just any new information in blind fashion. On the contrary, it led them to process new information carefully, thus producing more persuasion in response to strong arguments than in response to weak arguments.

In addition to illuminating the nature of the attitude change effect, thoughtful processing in Experiment 3 could be viewed as an indicator of reduced attitude strength in its own right. Indeed, some researchers have argued that people sometimes engage in thoughtful processing of persuasive information when their attitude has been weakened (e.g., when their actual attitude confidence has fallen below their desired attitude confidence; Chaiken, Liberman, & Eagly, 1989). The logic for this effect would be that when people lose confidence in their attitudes, they become increasingly willing—even motivated—to consider new attitude-relevant information, even if it contradicts what they initially believed. The results of Experiment 3 are consistent with this finding and offer further evidence for the differential strength-related consequences of attitude certainty for high, versus low, ambivalence attitudes.

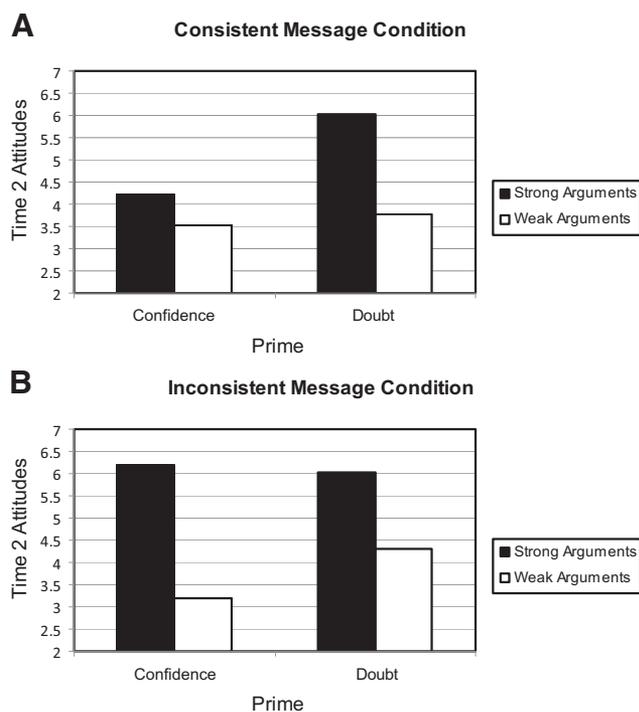


Figure 3. Time 2 attitudes as a function of prime and argument quality for (A) consistent and (B) inconsistent message conditions in Experiment 3.

⁷ Although the pattern of correlations was in the predicted direction, the differences between the correlations within the univalent and ambivalent attitude conditions were not statistically significant. The lack of significance likely stems from the relatively small sample size (~ 25) in each condition. Future studies with greater power for testing these differences would be useful.

⁸ Argument quality effects in persuasion research traditionally have been analyzed with postmessage attitudes. Thus, we presented the analyses for Time 2 attitudes alone, for ease of interpretation. However, we conducted additional analyses using attitude change difference scores and Time 2 attitudes, controlling for Time 1 attitudes. These analyses produced significant three-way interactions on both attitude change scores, $F(1, 91) = 6.99, p = .01$, and Time 2 attitudes, controlling for Time 1 attitudes, $F(1, 90) = 9.38, p = .003$, in the same pattern as the presented data.

In addition, Experiment 3 included a measure of behavioral intentions to examine how certainty affects an attitude's tendency to predict behavior when the attitude is univalent versus ambivalent. As predicted by the amplification hypothesis, greater certainty (from the confidence prime) tended to foster higher attitude-behavioral intention correspondence when attitudes were low in ambivalence but lower attitude-behavioral intention correspondence when attitudes were high in ambivalence. This result is consistent with the notion that increasing attitude certainty when ambivalence is low makes people more reliant on their attitudes in determining behavior, whereas increasing attitude certainty when ambivalence is high makes people less reliant on their attitudes in determining behavior. This result conceptually replicates the findings of the first two experiments with a different test of attitude strength.

General Discussion

Attitude certainty has been the focus of considerable research attention in social psychology (for reviews, see Gross et al., 1995; Tormala & Rucker, 2007). This attention stems, at least in part, from the fact that attitude certainty is believed to have a number of important consequences. In the present research, we took a new look at these consequences to determine whether they are more aptly construed as crystallizing or as amplifying in nature. The traditional view—in fact, the only view to emerge from past theory and research—is that certainty is a crystallizing agent, such that increasing attitude certainty invariably increases attitude strength, making the attitude more durable and impactful. We term this view the crystallization hypothesis. The amplification hypothesis, proposed for the first time in the current research, makes a different prediction. According to this perspective, becoming certain of an attitude amplifies the dominant effect of that attitude on thought, judgment, and behavior. In this case, increasing attitude certainty can increase or decrease attitude strength, depending on salient structural aspects of the attitude in question.

In three experiments, we tested the crystallization and amplification hypotheses by comparing the effects of attitude certainty manipulations on univalent, versus ambivalent, attitudes. Comparing univalent attitudes and ambivalent attitudes provided a useful testing ground, as these kinds of attitudes are known to have different dominant effects—specifically, different implications for attitude-relevant behavior, resistance, and other strength-related outcomes. In each experiment, we found that certainty and ambivalence could be manipulated orthogonally. Indeed, when people received information from a high, rather than low, credibility source (Experiments 1 and 2) or were primed with confidence rather than doubt (Experiment 3), they were more certain of their attitudes, regardless of whether those attitudes were high in ambivalence or low in ambivalence.

Of greatest importance, across experiments, the data were consistent with the amplification hypothesis. In Experiments 1 and 2, increased attitude certainty decreased resistance to future attacks when attitudes were ambivalent. In Experiment 3, we examined the nature of this effect. We found that decreased resistance under high certainty-high ambivalence conditions occurred as a result of thoughtful processing, such that there were relative differences in persuasion depending on the strength of the persuasive attack. Experiment 3 also demonstrated that increasing attitude certainty

tended to reduce attitude-behavioral intention correspondence when attitudes were ambivalent. Coupled with the replication of the traditional effects of certainty when attitudes were low in ambivalence, this pattern of results across studies suggests that attitude certainty can serve as an amplifier of the dominant effect of the attitude. Thus, the current work challenges the traditional conceptualization of attitude certainty as an inherently crystallizing agent. It appears that attitude certainty is a more dynamic construct whose effect depends on salient structural features of the attitude to which it is attached.

Practical Application

In addition to having theoretical implications for our understanding of attitude certainty (and ambivalence), the amplification hypothesis has practical import. In the health domain, for instance, ambivalence is of central interest as many high-risk behaviors (e.g., excessive alcohol consumption, smoking) are thought to stem from the conflict between strong positive associations and strong negative associations (e.g., de Visser & Smith, 2007; Dormandy et al., 2006; Sherman, Rose, Koch, Presson, & Chassin, 2003). For example, a teen's attitude toward cigarettes can be shaped by competing positive (e.g., social acceptance) and negative (e.g., unhealthy) assessments of the consequences of smoking. The current research suggests that by understanding that ambivalent attitudes can be held with varying degrees of certainty, health practitioners might uncover new techniques for undermining smoking behavior. For example, increasing attitude certainty in a teenager who is ambivalent about smoking might boost his or her motivation to process a message against smoking, which could lead to more attitude change in that direction as long as the message is strong. In other words, the recommendation would be to elevate (undermine) attitude certainty before delivering an intervention message when the target attitude is ambivalent (univalent). Though this strategy is counterintuitive, and contradictory to past research, the results from three experiments suggest that it might be effective.

New Directions

The amplification hypothesis offers a parsimonious account for both previous findings on the effects of attitude certainty when attitudes are univalent and current findings on the effects of attitude certainty when attitudes are ambivalent. This perspective also raises new questions that merit attention in future research.

A New Perspective on Attitude Strength

In the current research we focused our attention on amplification effects related to attitude certainty; however, amplification effects might occur with other dimensions of attitude strength as well. Consider attitude importance. Personally important attitudes have been shown to be stronger—more stable, for instance—than personally unimportant attitudes (Krosnick, 1988). An amplification perspective would suggest that this effect is malleable. For example, perhaps this effect reverses when the attitude in question is ambivalent. Consistent with this possibility, Tourangeau, Rasinski, Bradburn, and D'Andrade (1989) demonstrated that individuals with highly ambivalent attitudes were more susceptible to context

(i.e., question wording) effects when they considered an issue to be high, rather than low, in importance. That is, importance seemed to accentuate ambivalent attitudes' vulnerability to contextual shifting. Thus, just as attitude certainty amplified the effects of ambivalence in the current work, so too might attitude importance. In future study, it would be useful to explore amplification effects stemming from attitude importance and other dimensions of attitude strength as well.

Amplification of Univalent Attitude Effects

The amplification hypothesis seems to provide a useful framework for understanding the effects of attitude certainty (and perhaps other strength dimensions). It is interesting to note, though, that although the current experiments alter our expectations for the effects of certainty when attitudes are ambivalent, they do not immediately change our expectations for the effects of attitude certainty when attitudes are univalent. As discussed earlier, the crystallization and amplification hypotheses make the same predictions for univalent attitudes at a general level. Thus, it is worth asking whether the amplification hypothesis is useful under univalent attitude conditions.

We believe the amplification hypothesis does yield novel predictions about the effects of certainty on univalent attitudes. As but one example, it might have implications for affective–cognitive matching effects in persuasion. Although there has been some controversy in this area, past research generally suggests that people who hold attitudes that are primarily affective or cognitive in nature are more open to persuasion by messages that match (e.g., appealing to an affective attitude with a predominantly affective messages) rather than mismatch (e.g., appealing to an affective attitude with a predominantly cognitive message) the basis of their attitudes (e.g., K. Edwards, 1990; Fabrigar & Petty, 1999). Might attitude certainty moderate this phenomenon?

The crystallization hypothesis would suggest that attitudes held with higher certainty should generally be more resistant to persuasive attack, regardless of the affective or cognitive bases of the attitude and message. In contrast, the amplification hypothesis suggests that if certainty amplifies the dominant effect of the attitude, which depends on salient structural features of the attitude, then greater certainty in a predominantly affective or cognitive attitude might accentuate the matching effect. That is, affective attitudes held with high certainty might be more susceptible to affective (versus cognitive) messages than are affective attitudes held with low certainty. Similarly, cognitive attitudes held with high certainty might be more susceptible to cognitive (versus affective) messages than are cognitive attitudes held with low certainty. Even for univalent attitudes, then, the amplification perspective generates unique, novel, and potentially important predictions.

Attitude Clarity Versus Attitude Correctness

Finally, it would be interesting to explore different aspects of attitude certainty in the current context. Research by Petrocelli et al. (2007) suggested that although researchers typically study attitude certainty using global assessments, there are distinct

types of certainty that can be conceptually and empirically separated. In particular, Petrocelli et al. examined attitude clarity and attitude correctness. Whereas attitude clarity refers to the subjective sense that one knows what one's attitude is, attitude correctness refers to the subjective sense that one's attitude is correct or valid. In future research, it would be interesting to explore the extent to which both clarity and correctness confer amplification effects or whether one confers amplification and the other confers crystallization. Exploring the amplification versus crystallization effects of attitude clarity and attitude correctness would further expand existing conceptualizations of what certainty is and what it does.

Conclusions

The present research challenges classic and contemporary views of attitude certainty as a crystallizing agent, suggesting that it might be more appropriate to view attitude certainty as an agent of amplification. We put forth an amplification hypothesis, whereby certainty is proposed to amplify the dominant effect of an attitude on thought, judgment, and behavior. The current experiments tested this hypothesis by manipulating both ambivalence and attitude certainty and by exploring the effects of these manipulations on attitude strength-related consequences. Across experiments, increasing attitude certainty strengthened low ambivalence attitudes but weakened high ambivalence attitudes. This outcome suggests that attitude certainty has more dynamic consequences than previously believed. Our hope is that both researchers and practitioners will be encouraged by these findings to consider the diverse and fluid implications of attitude certainty, and perhaps other dimensions of attitude strength, in future work.

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