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Attitude Certainty: A Review of Past Findings and Emerging Perspectives

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Abstract

Attitude certainty, or the sense of conviction with which one holds one's attitude, has been the subject of considerable research attention. This article provides an overview of past, present, and future research on this topic. First, we review past work on attitude certainty, focusing on what has been learned about the antecedents and consequences of feeling certain or uncertain of one's attitude. Following this review, we examine emerging perspectives on attitude certainty. In particular, we describe recent work exploring the metacognitive appraisals that shape attitude certainty, the different meanings attitude certainty can have, and the dynamic effects of attitude certainty on attitude strength. Along the way, we also highlight important questions that have yet be answered about the certainty construct.

Within the social psychological literature over the past few decades, considerable attention has been devoted to the study of attitude certainty. Whereas an attitude refers to one's evaluation of something (e.g., the extent to which one likes a person, favors a brand, or supports a policy), attitude certainty refers to the subjective sense of conviction one has about one's attitude, or the extent to which one is confident or sure of one's attitude (Abelson, 1988; Festinger, 1954; Gross, Holtz, & Miller, 1995). Thus, attitude certainty is a metacognitive aspect of attitudes in that it reflects a secondary cognition (e.g., Ron is certain that he dislikes sharks.) attached to a primary cognition (i.e., Ron's negative attitude toward sharks) (Petty, Briñol, Tormala, & Wegener, 2007). Attitude certainty can range from low to high, but it need not be grounded in reality. That is, people can feel certain or uncertain, and this assessment can be independent of what any objective 'evidence' suggests is warranted. For instance, one might feel quite certain that one likes smoking despite clear evidence that it is harmful to one's health, that it leaves a foul odor on one's clothes, and that it makes one unattractive to potential romantic partners.

Attitude certainty is considered to be a dimension of attitude strength, where attitude strength is defined as the durability and impactfulness of

an attitude (Krosnick & Petty, 1995). In general, strong attitudes are more durable and impactful than are weak attitudes. Compared to weak attitudes, then, strong attitudes are more likely to guide behavior, more likely to resist influence attempts, and more likely to persist across time (for reviews, see Petty & Krosnick, 1995). Attitude certainty is distinct from other dimensions of attitude strength, such as attitude extremity, attitude importance, attitude accessibility, and attitude intensity (e.g., Krosnick, Boninger, Chuang, Berent, & Carnot 1993; Visser, Bizer, & Krosnick, 2006).

As one example of the distinctiveness of attitude certainty, consider its relation with attitude extremity. Attitude extremity refers to the degree to which one's attitude is positive or negative (Abelson, 1995). Although it is tempting to view attitude certainty and extremity as inherently linked, these constructs are conceptually and empirically distinct. Consider two individuals who report the same negative attitude toward beets (e.g., –2 on a –3 to +3 scale). Although these individuals hold what appears to be the same attitude, they could differ in attitude certainty. For example, perhaps one individual has tried beets several times and is quite certain that she does not like them, whereas the other individual has never tried beets but does not like the way they look. Recognizing that he has never actually tasted beets, the second individual might hold his negative attitude with less certainty. Consistent with the conceptual argument that attitude certainty and extremity are distinct, numerous studies have shown that attitude certainty can be manipulated in the absence of any changes in attitude extremity (e.g., Rucker & Petty, 2004; Rucker, Petty, & Briñol, forthcoming; Tormala & Petty, 2002; Tormala, Clarkson, & Petty, 2006).

Antecedents and Consequences of Attitude Certainty

Supporting the argument that attitude certainty is not redundant with other dimensions of attitude strength, a voluminous body of research has been dedicated to understanding the unique origins, or antecedents, of attitude certainty, as well as the potentially important consequences of being certain or uncertain of one's attitude. In this section, we review past research on the antecedents and consequences of attitude certainty. Our review is not intended to be exhaustive, but rather to provide some highlights that offer a basic foundation for understanding past approaches and findings.

Antecedents

Direct experience. Some of the earliest experimental approaches to understanding the antecedents of attitude certainty focused on the extent to which people's attitudes were based on direct versus indirect experience. In general, this research demonstrated that people tend to be more certain

of their attitudes when those attitudes are formed through direct (e.g., first hand interactions) rather than indirect (e.g., second hand viewing or reading) experience (e.g., Fazio & Zanna, 1978; Wu & Shaffer, 1987). Fazio and Zanna randomly assigned participants to read about five different problems (e.g., mazes, general reasoning tasks, spatial perspective tests) or to actually work through the problems. Fazio and Zanna then assessed participants' attitudes toward the problems followed by their attitude certainty. Participants reported being more certain of their attitudes when they had worked through the problems compared to only reading about them. Although never tested directly, a common explanation for these findings is that direct, compared to indirect, experience may afford a different knowledge base that lends itself to increased certainty. For example, direct experience may produce greater perceived knowledge about the attitude object, and greater perceived knowledge has been shown to foster greater attitude certainty (e.g., Smith, Fabrigar, MacDougal, & Wiesenthal, forthcoming).

Repetition and attitude accessibility. Merely repeating one's attitude multiple times also has been shown to affect attitude certainty (e.g., Holland, Verplanken, & van Knippenberg, 2003; Petrocelli, Tormala, & Rucker, 2007). For example, Holland et al. (2003) had participants report their attitudes toward an issue either six times or a single time, and found that participants expressed greater attitude certainty in the repeated expression condition. Furthermore, Holland et al. found that this difference in attitude certainty was mediated by differences in attitude accessibility. That is, expressing one's attitude six times made it more accessible in memory, relative to expressing it just once, and this heightened accessibility led to increased attitude certainty.

Online versus memory-based processing. Researchers have long been interested in the effects of forming attitudes in an online (i.e., as information is received) versus more memory-based (i.e., later, when an attitude or judgment is needed, based on the information that can be recalled) fashion (e.g., Hastie & Park, 1986; Tormala & Petty, 2001). Bizer, Tormala, Rucker, and Petty (2006) recently applied this distinction to attitude certainty. Bizer et al. (2006) presented participants with behavioral statements about a person named 'Marie' and instructed them to either evaluate each statement as it was received (online attitude formation) or rate the extent to which the statement had a dynamic linguistic structure (memory-based attitude formation), which was intended to distract from online evaluation. Subsequently, all participants were asked to report their attitudes toward Marie, as well as the certainty with which they held these attitudes. Bizer et al. found that attitudes formed online were held with greater certainty than attitudes formed from memory. They argued that greater certainty following online attitude formation might stem from the

differential metacognitive experience of having an attitude at the ready when it is requested. The logic behind this effect would be somewhat akin to students feeling more certain of their answers on tests when they already formed those answers while studying rather than constructing them on the spot based on the information available in memory.

Subjective ease. On a related note, attitude certainty can be affected by the subjective experience of ease or difficulty in thinking about attitude-relevant information. Haddock, Rothman, Reber, and Scwharz (1999), for example, instructed participants to recall an easy (small) or difficult (large) number of arguments in support of their attitudes. Haddock et al. found that participants were more certain of their attitudes after recalling an easy rather than difficult number of arguments. The rationale for this finding is that when it is easy to retrieve supportive arguments, those arguments seem more valid (Tormala, Petty, & Briñol, 2002) or frequent in number (Schwarz et al., 1991), making the attitude they support seem more justified.

Interestingly, recent research also suggests another possible account, based more on structural interpretations of the ease of retrieval effect. Tormala, Falces, Briñol, and Petty (2007) found that when people were asked to generate a large and difficult number of arguments in one direction, they also spontaneously generated more unrequested arguments, or arguments in the opposite direction. Applying this notion to the findings of Haddock et al. (1999), when people were asked to list a large number of arguments supporting their attitude, they may also have generated more opposing arguments. If true, this structural difference (i.e., the increased presence of counterattitudinal information) might have undermined attitude certainty. Indeed, Smith et al. (forthcoming) recently demonstrated that manipulated differences in the structural consistency of attitude-relevant knowledge can affect attitude certainty. The more consistent one's underlying knowledge, the more certain one is of one's attitude.

Social consensus. Numerous studies also suggest that people hold attitudes with greater certainty when those attitudes are supported by a high degree of social consensus or agreement (e.g., Festinger, 1954; Orive, 1988; Petrocelli et al., 2007; Visser & Mirabile, 2004). Visser and Mirabile (Experiment 2), for instance, exposed undergraduate participants to a computer-based discussion of a campus issue. Participants were randomly assigned to learn that everyone in the discussion agreed with them or that there were heterogeneous opinions on the topic. Participants later reported greater attitude certainty when they had been exposed only to opinions that aligned with their own as opposed to opinions that were more varied. That is, attitude certainty was greater following attitudinal agreement rather than disagreement. In essence, people infer validity from social consensus (e.g., Fazio, 1979) – consensus is thought to signal that all the evidence

points to the same attitude, which boosts attitude certainty if one holds that attitude oneself.

Consequences

As noted earlier, interest in attitude certainty stems largely from the fact that attitude certainty has important implications for the durability and impact of an attitude. In particular, attitude certainty has consequences for attitude–behavior correspondence, an attitude's tendency to resist persuasive attack, an attitude's general persistence or stability over time, and people's motivation to process new information. We discuss each of these consequences in turn.

Attitude-behavior correspondence. Perhaps the most frequently studied consequence of attitude certainty is its effect on attitude–behavior correspondence. A number of studies have now demonstrated that as attitude certainty increases, attitudes become increasingly likely to guide behavior (e.g., Berger & Mitchell, 1989; Bizer et al., 2006; Fazio & Zanna, 1978; Krishnan & Smith, 1998; Rucker & Petty, 2004; Tormala & Petty, 2002). In the work on direct experience discussed earlier, for instance, Fazio and Zanna found that attitudes were more predictive of behavior under conditions in which attitudes were held with high (direct experience) rather than low (indirect experience) certainty. This effect presumably stems from the fact that certainty makes an attitude seem accurate in some way, which suggests that it is an appropriate guide for behavior. Consistent with the notion that attitude certainty directly contributes to attitude–behavior correspondence, recent research manipulating certainty has demonstrated that differences in attitude–behavior correspondence across conditions disappear after controlling for corresponding differences in attitude certainty (Rucker & Petty, 2004; Tormala & Petty, 2002).

Resistance to attack. Also important, attitudes held with high certainty are more likely than attitudes held with low certainty to resist persuasive attacks or other influence attempts (e.g., Babad, Ariav, Rosen, & Salomon, 1987; Bassili, 1996; Kelley & Lamb, 1957; Krosnick & Abelson, 1992; Petrocelli et al., 2007; Swann, Pelham, & Chidester, 1988; Tormala & Petty, 2002). Although numerous studies have converged on this finding, the specific process by which certainty fosters greater resistance is unknown. One possibility is that certainty signals validity, which increases the amount and strength of counterattitudinal information required for change. A second possibility is that certainty leads people to be more aggressive in their counterarguing, which may intensify their resistance attempts (e.g., Swann & Ely, 1984). Finally, certainty might simply reduce the need for additional information (see discussion on information

processing), making people less inclined to process counterattitudinal information (cf. Albarracín & Mitchell, 2004). Understanding whether and when each of these processes operates would be a useful direction for future research.

Persistence over time. Even without being directly challenged, attitudes can change over time. Although relatively few efforts have been made to examine the role of certainty in predicting attitude persistence, past research has demonstrated that attitudes held with greater certainty are more persistent over time than attitudes held with less certainty (Bassili, 1996; see also Bizer et al., 2006). Why would attitudes held with certainty persist longer if uncontested? One potential explanation is that attitudes associated with high certainty might be more frequently consulted as behavioral guides, eliciting differential access of or reliance on attitudes among high compared to low certainty individuals. As a result, attitudes held with certainty may enjoy greater accessibility (see Fazio, 1995; Holland et al., 2003), reducing their susceptibility to various contextual factors (Schwarz & Bohner, 2001) and, thus, holding steadier over time.

Information processing. Finally, attitude certainty has been shown to affect the amount of energy people direct toward information processing. In particular, high certainty tends to be associated with decreased information processing activity compared to low certainty (Edwards, 2003; Tiedens & Linton, 2001; Weary & Jacobson, 1997). The traditional explanation has been that subjective certainty indicates that people already possess sufficient knowledge, which reduces the need to process new information. Conversely, uncertainty indicates that people do not have sufficient knowledge, and scrutinizing additional information offers one way to acquire knowledge and restore or establish certainty. This logic has been most explicitly incorporated into the sufficiency principle of the heuristic–systematic model of persuasion (Chaiken, Liberman, & Eagly, 1989), which suggests that information processing can be guided by the discrepancy between people's current level of certainty and their desired level of certainty. When this discrepancy is high, people process information more carefully to obtain the desired certainty, but when the discrepancy is low, processing resources are conserved (see Bohner, Rank, Reinhard, Einwiller, & Erb, 1998). Thus, according to the sufficiency principle (Chaiken et al., 1989), uncertainty will not boost processing if one's *desired* level of certainty is sufficiently low.

Another moderator of the effect of certainty on information processing is the framing of the information to be processed. Tormala, Rucker, and Seger (forthcoming) found that when a persuasive message was framed in terms of confidence – that is, it was thought to be related to confidence or achieving confidence – message recipients processed that message more deeply when they felt confident as opposed to doubtful. In other words,

confidence framing reversed the classic effect of certainty on information processing. Tormala et al. reasoned that when the message was framed in terms of confidence, people may have perceived that message to be more personally relevant when they felt confident rather than doubtful due to the perceived match between their psychological state and the message frame. For doubtful individuals, the confidence framing itself might have increased confidence sufficiently, reducing the need to process further. Although Tormala et al. did not examine *attitude* certainty directly (they manipulated more global feelings of confidence versus doubt), their findings were consistent with the notion that attitude certainty might have a more complex relationship with information processing than traditionally believed.

A Metacognitive Approach to Attitude Certainty

It is clear that the past few decades have seen great strides made in understanding the antecedents and consequences of attitude certainty. Interestingly, though, much of the research over the years has been ambiguous with respect to the specific psychological underpinnings of attitude certainty. In particular, as we have hinted, there has been ambiguity in past research regarding the extent to which attitude certainty stems from cognitive (i.e., structural) or metacognitive sources, or both. Metacognition refers to people's thoughts about their own thoughts or thought processes (Jost, Kruglanski, & Nelson, 1998; Petty et al., 2007; Yzerbyt, Lories, & Dardenne, 1998). Although researchers generally have speculated that structural phenomena are responsible for attitude certainty effects (pointing to things like accessibility differences, knowledge differences, and so on), metacognitive factors also have been implicated, generally with a lack of concrete evidence either way.

In some of our own recent research, we have focused on the metacognitive factors that shape attitude certainty. In this work, we have focused primarily on the way attitude certainty is influenced by people's encounters with persuasive messages (see Petty, Tormala, & Rucker, 2004; Tormala, forthcoming). We propose that when people receive persuasive messages, they can perceive their own responses to these messages (i.e., persuasion or resistance), reflect on those responses, and form attribution-like inferences about their attitudes that have implications for attitude certainty. Just as individuals can observe other people's behavior to form inferences about those people, we postulate that people can observe the activity of their own attitudes (e.g., resisting or succumbing to persuasive messages) to form inferences about those attitudes. Furthermore, we posit that these effects can occur in the absence of any differences in the structure of people's attitudes or the underlying content of their cognition (e.g., their attitude valence, extremity, or accessibility; the number or type of thoughts they have).

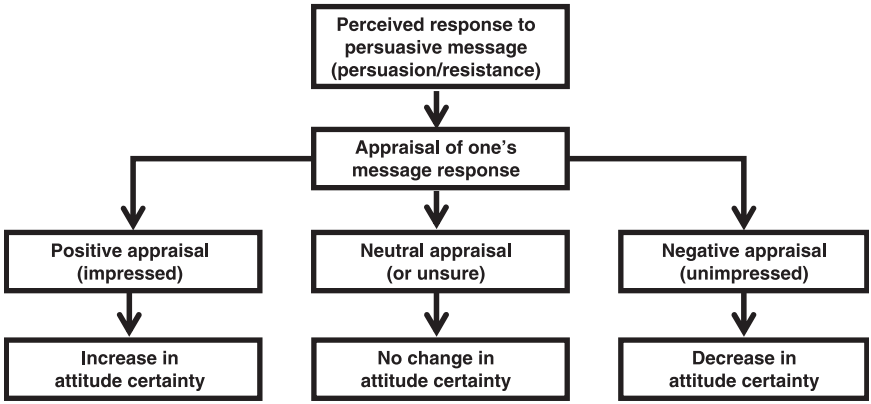

Figure 1 A metacognitive framework for message response appraisals (adapted from Tormala, forthcoming; Petty et al., 2004).

Resistance and persuasion appraisals

How do people's perceptions of their own responses to persuasive messages affect attitude certainty? We have proposed an attributional logic (see Kelley, 1972), suggesting that people can become either more or less certain of their attitudes following an encounter with a persuasive message, depending on their perceptions of their response to that message and the situation in which it occurs. Situational factors that foster positive appraisals of one's message response should increase attitude certainty, whereas situational factors that foster negative appraisals of one's message response should decrease attitude certainty (see Figure 1). In other words, people should become more certain of their attitudes when they believe their message response is justified, correct, legitimate, appropriate, or impressive (positive appraisal); and less certain of their attitudes when they believe their message response may be unjustified, incorrect, illegitimate, inappropriate, or unimpressive (negative appraisal). Furthermore, because our emphasis is on metacognitive factors, we submit that these effects can occur in the absence of any differences in people's actual message responses. That is, regardless of whether people actually were resistant to or persuaded by a message, or whether their resistance or persuasion was correct or impressive in some way, they can become more or less certain of their attitudes when their subjective assessment of their message response leads them to a positive or negative appraisal, respectively.

What determines people's appraisals?

We recently have been exploring the determinants of message response appraisals. This research has revealed a number of variables that can

moderate the impact of people's perceptions of their own persuasion or resistance on attitude certainty. In this section, we highlight some of the key variables that have emerged from our research.

Perceived message strength. One variable that has proven important in this area is the perceived strength of a persuasive message – that is, the extent to which a message is believed to contain strong or weak arguments. In an initial experiment exploring this variable, Tormala and Petty (2002) led undergraduate participants to believe their university was considering a new policy requiring all students to pass a series of comprehensive examinations prior to graduation. Following an introduction to this policy, participants were led to believe that the researchers conducting the study were interested in learning about students' reactions to the various arguments that had been raised in its favor. Then, participants were instructed that they had been randomly assigned to receive what the researchers deemed to be either strong or weak arguments supporting the policy. In actuality, all participants received the exact same message, but they were given the impression that the message was considered strong or weak. Following the message, participants were induced to resist the advocacy by generating counterarguments against it, after which they reported attitudes and attitude certainty.

As predicted, all participants resisted the message (i.e., no attitude change for either group). Most germane to the metacognitive framework, participants became more certain of their attitudes when they believed the message they resisted was strong as opposed to weak. In essence, participants formed more positive resistance appraisals when they perceived that they resisted strong rather than weak arguments. Consistent with this explanation, Tormala and Petty (2002; Experiment 2) also found that this attitude certainty effect was mediated by participants' subjective assessments of their resistance performance. Participants rated their own resistance more favorably, and thus became more certain of their attitude, when they believed that they had resisted strong rather than weak arguments. This effect was particularly telling given that there were no actual differences in participants' attitudes or counterarguments across conditions. In subsequent research, this effect has been shown to be moderated by elaboration (Tormala & Petty, 2004a) and people's naïve theories about resistance (Rydell, Hugenberg, & McConnell, 2006), but the core logic underlying the effect – that people become more certain of their attitudes when they think about their resistance and form positive appraisals of resisting strong arguments – has been retained.

To date, there is no solid evidence for the effect of perceived message strength on attitude certainty following instances of successful persuasion. Nevertheless, we suspect that it will prove important in this domain as well. It could be that the effect following successful persuasion will parallel

what has been found in the resistance studies. That is, perhaps people become more certain of their newly changed attitudes when they believe those attitudes have been changed by strong, and thus valid, arguments. Alternatively, it could be that the opposite effect emerges. That is, perhaps people are more certain of their newly changed attitudes when they believe those attitudes have been changed by weak rather than strong arguments. After all, if one's attitude was changed by weak arguments, one can assume that one's attitude also would be changed by any stronger arguments available. If, however, one's attitude was changed by strong arguments, the possibility remains that weaker arguments exist that could have been resisted. For now, this issue remains to be examined in future research.

Source credibility. Source credibility also has been identified as a moderator of people's response appraisals. In the resistance domain, this effect looks very much like the perceived message strength effect. For example, Tormala and Petty (2004b) induced participants to resist a persuasive message from a source with high or low expertise, and found that participants became more certain of their attitudes after resisting an expert source, but not after resisting an inexpert source. In the persuasion domain as well, source credibility has been found to affect attitude certainty. Rucker and Petty (2007) presented participants under high elaboration conditions with strong persuasive messages from sources with high or low expertise. Rucker and Petty found that although participants were equally persuaded by the message in the high- and low-expertise conditions, they were more certain of their newly formed attitudes following the high- rather than low-expertise source.

Across the resistance and persuasion domains, then, people appear to become more certain of their attitudes following high rather than low credibility sources, perhaps because people feel more knowledgeable and/or think they have access to cogent arguments if they have resisted (or accepted) a message from a highly credible source. As a caveat to this general conclusion, people do not appear to form positive appraisals of their resistance or persuasion if they perceive that they have directly based that resistance or persuasion on the message source. For example, Tormala, DeSensi, and Petty (2007) found that people lose attitude certainty when they perceive that they have resisted persuasion from a source in the numerical minority on the sole basis of that source's minority status. Tormala et al. theorized that people generally think it is illegitimate to disagree with an idea just because it is supported by a minority of their peers. Consistent with this account, follow-up experiments have revealed that when there are other reasons to resist (e.g., weak arguments), people do not lose certainty after rejecting a minority source's position (DeSensi & Tormala, 2007). DeSensi and Tormala also found that when people *accept* a *majority* source's position, they tend to feel less certain of their

attitudes if there is no other rationale for acceptance (such as strong arguments). Therefore, although people feel certain of their attitudes when they reject or accept a message *and* its source has particular features, they may not always feel so certain when they reject or accept a message *because* its source has particular features.

Perceived thought quality. People's subjective perceptions of the quality of their cognitive responses – that is, the individual thoughts they generate while processing a persuasive message – also can determine the certainty with which they hold their attitudes. In general, the more valid people think their thoughts are, the more certain they are about the postmessage attitudes. Correlational evidence for this conclusion comes from a study by Petty, Briñol, and Tormala (2002). Petty et al. (2002) presented participants with a persuasive message and asked them to generate positive or negative thoughts in response to it. They then measured the confidence with which participants held their positive or negative thoughts. Results indicated that postmessage attitude certainty increased as confidence in individual thoughts increased, regardless of whether those thoughts were positive or negative.

In related research focusing on resistance to persuasion, Tormala et al. (2006) manipulated participants' perceptions of their own counterarguments against a persuasive message. Tormala et al. (2006) induced participants to argue against a persuasive attack and then gave participants false feedback about the quality, or strength, of their counterarguments. Some participants were led to believe that their counterarguments were strong, whereas others were led to believe that their counterarguments were weak. Tormala et al. found that participants were more certain of their resistant attitudes when they believed they had resisted using strong as opposed to weak counterarguments. In short, people's perceptions of the quality their own cognitive responses to a persuasive message (in the absence of any objective differences) appear to influence their persuasion and resistance appraisals and, thus, determine the certainty with which they hold their attitudes.

One- versus two-sided messages. Recent studies have revealed that attitude certainty following a persuasive message also can be affected by the extent to which an individual focuses on (Rucker & Petty, 2004) or a message addresses (Rucker et al., forthcoming) one or both sides of an issue. Rucker et al. (forthcoming) presented participants with advertisements containing several positive arguments in favor of new products. They varied whether the advertisements also raised potential negative arguments. When advertisements considered both sides, they included lines such as 'negative reviews: none' or called participants' attention to minor negative pieces of information (e.g., this mountain bike does not come with a water bottle). Participants had equal access to positive information across

conditions, then, but they had the companion perception that negative information had been considered with the two-sided but not the one-sided advertisements. Rucker et al. found that although participants were equally persuaded by the two versions of the advertisements, they were more certain of their attitudes when advertisements discussed both sides. Apparently, people perceive that more of the pertinent information or knowledge has been considered when a persuasive message raises both the pros and cons to an object or issue. This feeling of greater knowledge, in turn, fosters greater attitude certainty (see also Smith et al., forthcoming). In essence, two-sided messages foster positive persuasion appraisals, thus boosting certainty. Future research should examine whether one- versus two-sided messages differentially affect attitude certainty following resistance to persuasion as well.

Response similarity. Social contextual factors also can guide response appraisal effects. As reviewed earlier, it is well established that people tend to be more certain of their attitudes when they believe those attitudes are shared by others (e.g., Festinger, 1954; Orive, 1988; Petrocelli et al., 2007; Visser & Mirabile, 2004), presumably because learning that other people share one's attitude provides social validation for that attitude (Fazio, 1979). Recent research suggests that just as perceptions of others' attitudes can provide social validation for one's own attitudes, perceptions of others' message responses (i.e., persuasion or resistance) can provide social validation for one's own responses.

Tormala, DeSensi, Clarkson, and Rucker (2007) have proposed a response similarity hypothesis, suggesting that when people receive persuasive messages, they will be more certain of their postmessage attitudes when they believe their message responses are similar to rather than different from the responses of others. In a series of experiments, participants were presented with persuasive messages, after which they were induced to evaluate the messages positively or negatively or have the perception that they had been persuaded or resistant. Results indicated that whether people evaluated messages positively or negatively (or perceived that they had been persuaded or resistant), they were more certain of their attitudes when they perceived that other people responded similarly rather than dissimilarly. Moreover, this response similarity effect moderated the effect of *attitude* similarity on certainty. Even when participants believed they held the same postmessage attitudes as others, they felt uncertain about those attitudes if they believed their message responses differed (e.g., if others found the message persuasive but they did not), presumably because different message responses imply different underlying knowledge or assessments of key arguments. These findings suggest that people's message response appraisals attune not only to their own persuasion and resistance, but also to the persuasion and resistance of other people in the social context. When one's own response matches (mismatches) the

responses of others, one forms more positive (negative) response appraisals, producing higher (lower) levels of attitude certainty.

Perceived processing effort. Finally, recent attention has been paid to the impact of perceived processing effort on attitude certainty following persuasive messages. In one study, Smith et al. (forthcoming), presented participants with a persuasive message under high or low cognitive load. They found that relative to low-load participants, participants under high load perceived that they had thought less carefully about the attitude object. This perception, in turn, undermined attitude certainty in the high- compared to the low-load condition. That is, the less participants believed they had thought about the attitude object (because they were distracted while processing the persuasive message), the less certain they felt about their attitudes.

In another demonstration, Wan, Rucker, Tormala, and Clarkson (2007) examined perceptions of processing effort while controlling for actual levels of processing. Specifically, Wan et al. (2007) randomly assigned participants to complete or not complete a resource depletion task immediately before receiving a persuasive message. Wan et al. found that although participants' actual processing of and attitudes toward the issue raised in the message were no different across conditions, participants reported greater attitude certainty when they were previously depleted as opposed to not depleted. Moreover, this effect was mediated by perceived processing effort. Participants felt as though they had expended greater cognitive effort processing the message when they felt depleted compared to not depleted and, thus, felt more certain of their attitudes under depletion conditions. This effect was independent of whether participants resisted or were persuaded by the message. In short, it appears that people form more positive appraisals of their message responses when they believe those responses are based on effortful cognitive processing (see also Barden, 2005). Perhaps more effortful processing is assumed to lead to more accurate assessments of message validity, fostering greater postmessage attitude certainty.

New Perspectives on Attitude Certainty

As the present review attests, there has been considerable progress in our understanding of attitude certainty. Despite this progress, there still is much to learn. Ironically, we suspect that some of the more pressing questions in this domain are also the questions that the earliest attitude certainty researchers sought to investigate. In particular, what does it really mean to be certain of one's attitude? What does attitude certainty really do for (or to) our attitudes? In this final section, we review some of our current work on attitude certainty that revisits these questions and, we think, highlights important new directions for research in this domain.

What does it really mean to be certain of an attitude?

As noted at the outset of this article, attitude certainty traditionally has been defined somewhat broadly as the sense of conviction one has about one's attitude, or the extent to which one feels confident or sure about one's attitude. Based on this view of attitude certainty, researchers (including the present ones) typically have assessed attitude certainty using global measures that ask participants things like, 'How certain are you of your attitude toward capital punishment?' or 'How sure are you of your opinion about gun control?' These measures have proven extremely useful in past research and should continue to serve researchers well. Nevertheless, we have begun to explore the possibility that global attitude certainty measures might mask important differences that exist between different, more specific, forms of certainty.

A multifactor model of certainty. We have proposed a multifactor model of attitude certainty, suggesting that the general state of attitude certainty – as indicated by statements such as, 'I am very certain of my attitude toward capital punishment' – might reflect a number of different certainty-type assessments. In our work thus far, we have focused on two forms of attitude certainty: attitude clarity and attitude correctness. *Attitude clarity* refers to the subjective sense that one knows what one's attitude on a topic really is. *Attitude correctness* refers to the subjective sense that one's attitude is correct or valid. Although clarity and correctness might often be correlated in practice, these two forms of certainty are conceptually distinct. One might feel quite certain that one knows what one's attitude is ('I know I didn't like that movie.'), for example, without being certain of that attitude's correctness ('Everyone else seemed to like it, though, so maybe I missed something.').

Empirical evidence. Petrocelli et al. (2007) recently conducted a series of studies to tease these two forms of certainty apart. In one study, Petrocelli et al. developed a number of different items designed to tap feelings of either attitude clarity (e.g., 'How certain are you that you know what your true attitude on this topic really is?') or attitude correctness (e.g., 'How certain are you that your attitude on this topic is the correct attitude to have?'). They found that clarity and correctness items were positively correlated, but they loaded onto separate factors in both exploratory and confirmatory factor analyses (see Table 1). Moreover, both clarity and correctness contributed to global attitude certainty in a simultaneous regression analysis, even after controlling for attitude extremity. Thus, clarity and correctness could be measured separately, and each appeared to explain unique variance in global feelings of attitude certainty.

In subsequent experiments, Petrocelli et al. (2007) explored the extent to which clarity and correctness had unique antecedents. They proposed

Table 1 Attitude clarity and attitude correctness items and factor loadings (adapted from Petrocelli et al., 2007; Experiment 1)

	Factor loadings			
	Sample 1		Sample 2	
Item	**1**	**2**	**1**	**2**
1. How certain are you that you know what your true attitude on this topic really is?	**0.90**	0.13	**0.94**	0.06
2. How certain are you that the attitude you expressed really reflects your true thoughts and feelings?	**0.69**	0.29	**0.78**	0.22
3. To what extent is your true attitude clear in your mind?	**0.75**	0.26	**0.85**	0.22
4. How certain are you that the attitude you just expressed is really the attitude you have?	**0.88**	0.05	**0.89**	0.11
5. How certain are you that your attitude is the correct attitude to have?	0.22	**0.75**	0.11	**0.84**
6. To what extent do you think other people should have the same attitude as you on this issue?	–0.06	**0.75**	0.00	**0.59**
7. How certain are you that of all the possible attitudes one might have, your attitude reflects the right way to think and feel about the issue?	0.01	**0.91**	–0.07	**0.91**

Note. Sample 1: Indiana University, $N = 124$, exploratory factor analysis. Sample 2: Ohio State University, $N = 76$, confirmatory factor analysis. Attitude clarity (1–4) and attitude correctness (5–7) items were presented in random order to each sample.

that some variables might influence attitude clarity but not correctness, whereas other variables might influence attitude correctness but not clarity. Consider the effects of repeated attitude expression and attitude consensus on global attitude certainty, reviewed earlier. Petrocelli et al. reasoned that these effects might mask more specific effects on clarity and correctness. For instance, repeated expression might increase feelings of attitude clarity but not correctness as repeatedly expressing the same attitude should facilitate the subjective sense that one knows what one's attitude on a topic is without making that attitude seem any more correct or valid. Conversely, attitude consensus, or perceived social support for one's attitude, might influence feelings of attitude correctness but not clarity. The rationale in this case is that believing that other individuals share one's attitude should bolster one's sense that that attitude is valid or justified, without making it seem any more one's own.

In one of several experiments designed to test these hypotheses, Petrocelli et al. (2007; Experiment 4) asked undergraduate participants to report their attitudes toward a new campus policy on either one or several attitude scales and then gave participants false feedback that either a

majority or minority of other undergraduates agreed with them. As predicted, the repeated expression manipulation affected attitude clarity (greater clarity was reported in the multiple rather than single expression condition) but not attitude correctness. Conversely, the attitude consensus manipulation affected attitude correctness (greater correctness was reported in the high rather than low consensus condition) but not attitude clarity. Also important, both attitude clarity and attitude correctness proved consequential. At the end of the experiment, participants were presented with a counterattitudinal persuasive attack. Participants' attitudes were more resistant to this attack when they were high rather than low in clarity, as well as when they were high rather than low in correctness.

The studies of Petrocelli et al. (2007) expand previous understandings of what it means to be certain of an attitude. In particular, they suggest that attitude certainty is not a monolithic construct, but rather that attitude certainty can consist of different dimensions that have unique antecedents and important consequences. Thus, reporting high attitude certainty following an experimental manipulation may mean very different things depending on the nature of the manipulation and, in turn, the origin of that feeling of certainty. Future research might uncover additional layers of attitude certainty and considering these layers would offer further insight into the certainty construct.

What does certainty really do for (or to) an attitude?

In addition to more precisely mapping out the origins of attitude certainty, we have been seeking to better understand the full extent of attitude certainty's consequences. As discussed already, the primary reason attitude researchers have been interested in attitude certainty over the years is that certainty has implications for other important phenomena. For example, the more certain one is of one's attitude, the more predictive that attitude is of behavior (e.g., Fazio & Zanna, 1978; Rucker & Petty, 2004; Tormala et al., 2006) and the more resistant that attitude is to attack (e.g., Babad et al., 1987; Petrocelli et al., 2007; Tormala, DeSensi, & Petty, 2007). Based on findings such as these, attitude certainty has been thought to act as a crystallizing agent such that increasing attitude certainty inherently increases attitude strength (i.e., durability and impactfulness; Petty & Krosnick, 1995). This *crystallization hypothesis* has been the dominant, if not only, view of attitude certainty in past research.

The amplification hypothesis. In contrast to the traditional view of attitude certainty as a crystallizing agent, recent research by Clarkson, Tormala, and Rucker (2007) suggests that it may be more appropriate to view attitude certainty as an amplifying agent. Clarkson et al. (2007) have proposed an *amplification hypothesis* for attitude certainty, suggesting that

attitude certainty does not invariably strengthen or crystallize an attitude, but rather that it amplifies the dominant *effect* of an attitude on thought, judgement and behavior. If an attitude's dominant effect is to be stable, for instance, the amplification hypothesis – like the crystallization hypothesis – suggests that increasing attitude certainty should accentuate that stability. If, however, an attitude's dominant effect is to be unstable, the amplification hypothesis departs from the crystallization hypothesis and suggests that increasing attitude certainty might accentuate that instability.

Numerous features of an attitude may determine that attitude's dominant tendency to be stable versus unstable. One such feature is the attitude's underlying univalence versus ambivalence. Whereas univalent attitudes are primarily positive or negative in valence, ambivalent attitudes contain both positive and negative valence (see Thompson, Zanna, & Griffin, 1995, for a review). It is well established that, all else equal, univalent attitudes are stronger than ambivalent attitudes. For example, univalent attitudes tend to be more resistant to persuasive attack (e.g., Armitage & Conner, 2000; Visser & Mirabile, 2004) and more predictive of attitude-relevant behavior (e.g., Armitage & Conner; Glasman & Albarracín, 2006) than their ambivalent counterparts.

The amplification hypothesis proposes that increasing attitude certainty might have different effects on attitude strength depending on the attitude's underlying ambivalence. In particular, when an attitude is univalent, increasing attitude certainty should increase attitude strength, as in past research. When an attitude is ambivalent, on the other hand, increasing attitude certainty might *decrease* attitude strength. Whereas both the crystallization and amplification perspectives make the former prediction (i.e., for univalent attitudes), only the amplification perspective makes the latter prediction. Thus, exploring the interplay between attitude certainty and attitude ambivalence may provide a vehicle for testing the crystallization versus amplification views of attitude certainty.

Can ambivalent attitudes be held with certainty? Testing the amplification hypothesis by pitting attitude certainty and ambivalence against one another clearly assumes that certainty and ambivalence are orthogonal dimensions of an attitude. Is there any evidence to support this assumption? As it turns out, considerable evidence suggests that attitude certainty and attitude ambivalence, although (negatively) correlated, are distinct. For example, factor analyses of attitude strength dimensions often have revealed that certainty and ambivalence load onto separate factors (e.g., Bassili, 1996). Furthermore, past research suggests that attitude certainty and attitude ambivalence can stem from distinct sources. Repeated attitude expression, for instance, affects attitude certainty but not attitude ambivalence (Petrocelli et al., 2007). Also, as noted already, presenting people with persuasive messages that raise both sides of an issue (Rucker et al., forthcoming) or asking people to consider both sides of an issue

Table 2 Predicted effects of attitude certainty and attitude ambivalence on attitude strength according to the crystallization and amplification hypotheses (Clarkson et al., 2007)

	Attitude certainty	
Attitude ambivalence	**Low**	**High**
	Crystallization hypothesis	
Low/univalent	Weaker attitude	Stronger attitude
High/ambivalent	Weaker attitude	Stronger attitude
	Amplification hypothesis	
Low/univalent	Weaker attitude	Stronger attitude
High/ambivalent	Stronger attitude	Weaker attitude

Note. Strong and weak are used relatively and refer to the consequences of attitude strength. Stronger (weaker) indicates higher (lower) levels of attitude–behavior correspondence, resistance to persuasive attack, and persistence across time.

(Rucker & Petty, 2004) can increase attitude certainty despite highlighting evaluatively incongruent information. Finally, there are intuitive reasons to view these constructs as distinct. A person could be ambivalent about ice cream, for instance, loving the taste but hating the calories, and feel highly certain of each evaluation.

If indeed attitude certainty and ambivalence are distinct, the question is: what impact does attitude certainty have when one's attitude is ambivalent? As outlined in Table 2, the crystallization hypothesis makes a main effect prediction, suggesting that increasing attitude certainty should always make an attitude stronger regardless of the underlying ambivalence. In contrast, the amplification hypothesis makes an interaction prediction, suggesting that increasing attitude certainty will make an attitude stronger when an attitude is univalent, but weaker when an attitude is ambivalent. Addressing these competing predictions is important as it has implications for our basic understanding of how certainty functions. Support for the amplification hypothesis would suggest a fundamental shift in our understanding of what attitude certainty really does.

Empirical evidence. Clarkson et al. (2007) explored these issues in a series of recent experiments. In one, they presented participants with a number of evaluative trait descriptions about a target person named 'Marie' and asked participants to form an attitude toward this person. To manipulate ambivalence, Clarkson et al. presented participants with either all positive traits (e.g., thoughtful, cheerful, sincere, loyal) or both positive and negative traits (e.g., thoughtful, cheerful, hypocritical, dishonest). To manipulate attitude certainty, Clarkson et al. led participants to believe that the traits were obtained from other people who knew Marie for either a very long

(high source credibility) or very short (low source credibility) period of time. After reading the trait descriptions, participants reported ambivalence (using a global index that combines objective and subjective assessments; see Priester & Petty, 1996), attitudes (using a single item: 'how much do you think you would like Marie?'), and attitude certainty (using a series of items such as 'how certain are you of your impression of Marie?'). Consistent with the notion that ambivalence and certainty are distinct properties of attitudes, participants reported greater attitude certainty in the high rather than low credibility condition, regardless of the evaluative consistency of the traits presented, and greater ambivalence in the inconsistent rather than consistent traits condition, regardless of source credibility. Of importance, there was no evidence to suggest that participants in the ambivalent condition felt more ambivalent when they had high rather than low certainty. These individuals were more certain of their ambivalent attitudes, but not more ambivalent.

Later in the experiment, Clarkson et al. (2007) presented participants with a message about Marie in which she was cast in a very negative light. Consistent with the amplification hypothesis, there was an interaction between trait consistency and source credibility in determining persuasion by this message. In the consistent traits condition, where ambivalence was low, participants were more resistant to persuasion in the high rather than low credibility condition. In other words, when ambivalence was low, participants exhibited greater resistance when they had high as opposed to low attitude certainty. In the inconsistent traits condition, where ambivalence was high, participants were *less* resistant to persuasion in the high rather than low credibility condition. Under high ambivalence conditions, then, participants exhibited greater *susceptibility* to persuasion when they had high as opposed to low attitude certainty. This finding reverses the classic effect of attitude certainty on resistance to persuasion, but is consistent with the amplification hypothesis.

In a subsequent experiment, Clarkson et al. (2007) extended these initial findings by testing another consequence of attitude certainty: attitude–behavior correspondence. Again, it is well established that high certainty attitudes are more predictive of behavior than low certainty attitudes (e.g., Fazio & Zanna, 1978). Clarkson et al. presented participants with either consistent (all negative) or inconsistent (both positive and negative) persuasive information about a store and then asked them to recall times in their lives when they felt very confident or very doubtful. Conceptually replicating the findings from the earlier experiment, participants reported greater ambivalence in the inconsistent rather than consistent message condition, regardless of the confidence or doubt recall task, and greater attitude certainty in the confidence rather than doubt recall condition, regardless of message consistency.

Most germane to the present concerns, Clarkson et al. (2007) also asked participants to report behavioral intentions by indicating the likelihood

that they would shop at the store if it came to their community. For participants in the consistent message condition, where ambivalence was low, attitude-behavioral intention correspondence was greater in the confidence (high attitude certainty) rather than doubt (low attitude certainty) recall condition, as would be expected from past research. In the inconsistent message condition, where ambivalence was high, this pattern was reversed. That is, attitude-behavioral intention correspondence was greater in the doubt (low attitude certainty) rather than confidence (high attitude certainty) recall condition. Thus, attitude certainty had opposite implications for attitude-behavioral intention correspondence depending on the level of ambivalence underlying the attitude. This result was consistent with the amplification hypothesis, but not the crystallization hypothesis.

The research of Clarkson et al. (2007) expands current understandings of attitude certainty, suggesting that certainty has a fluid impact that depends on other properties of the attitude in question, such as the level of ambivalence underlying the attitude. Of greatest importance, holding ambivalent attitudes with certainty appears to make those attitudes act even more ambivalent, although it does not increase ambivalence per se. In future studies, it might be fruitful to apply the multifactor model of attitude certainty to amplification effects (Petrocelli et al., 2007). It stands to reason that whether one feels high levels of attitude clarity ('I know that I truly am ambivalent on this issue.') or attitude correctness ('I know that ambivalence is warranted on this issue.'), amplification effects could emerge. Alternatively, it could be that clarity and correctness operate somewhat differently in this regard. For example, perhaps attitude clarity acts as an amplifying agent to the extent that it makes one's ambivalence more salient and pressing, whereas attitude correctness acts as a crystallizing agent to the extent that it makes ambivalence seem more appropriate and less troublesome. This issue would be useful to address in subsequent research.

Conclusion

As reviewed in this article, attitude certainty comes from many sources and has numerous and important consequences. We have made an effort to highlight both the foundations of attitude certainty research and the new directions in which this work is moving. It is clear to us that despite significant interest spanning several decades of inquiry, there remains much to learn. We suspect that research on the different forms of attitude certainty (Petrocelli et al., 2007) and the dynamic effects of attitude certainty (Clarkson et al., 2007) will pave the way for a new and more complete understanding of the certainty construct, expanding our knowledge of what it really means to be certain of an attitude and what that certainty really does. Ultimately, our hope is that this understanding will reach

beyond the domain of attitudes to help shed new light on the important role of psychological certainty in other domains of social judgment as well.

Short Biographies

Zakary L. Tormala is an Associate Professor of Marketing in the Graduate School of Business at Stanford University. He received his BA in Psychology from Arizona State University and his PhD in Social Psychology from Ohio State University in 2003. That year, Dr. Tormala started his career as an Assistant Professor in the Department of Psychological and Brain Sciences at Indiana University. He moved to Stanford in the summer of 2007. His research interests are in the areas of attitudes and social cognition. Much of his current work focuses on better understanding the role of metacognition in these domains. Dr. Tormala has published numerous journal articles and chapters exploring the role of metacognitive factors in attitude formation, maintenance, and change.

Derek D. Rucker is an Assistant Professor of Marketing at the Kellogg School of Management, Northwestern University. Dr. Rucker received his BA in Psychology from the University of California, Santa Cruz, and his PhD in Social Psychology from the Ohio State University in 2005. Dr. Rucker's primary research focuses on the study of attitudes, persuasion, and social influence. A majority of his work in these domains aims to better understand the role of metacognitive processes and emotions in persuasion. His work on these topics has appeared in a number of leading journals. Dr. Rucker is also a Kraft Research Professor in Marketing and teaches Advertising Strategy.

Endnote

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