



Elaboration and Attitude Strength: The New Meta-cognitive Perspective

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Abstract

The effect of elaboration (i.e., information processing) on attitude strength has been a key prediction of some of the most influential theories of persuasion over the past few decades. This article provides a new look at this relationship. After reviewing support for the notion that structural processes (i.e., knowledge acquisition, structural consistency, and attitude accessibility) drive the effect of elaboration on attitude strength, we examine recent work investigating the role of meta-cognitive factors in this domain. Based on recent evidence, we propose that the effect of elaboration on attitude strength depends largely on people's perceptions of their own elaboration and their beliefs that more elaboration produces better judgments that can be held with greater certainty. We highlight the role of naïve theories in these effects, suggesting that they might be more malleable than previously known, and call for future research into some of the important remaining questions in this area that have yet to be fully explored.

People receive countless persuasive communications during their everyday lives, from political campaign messages to product advertisements or even debates with colleagues. In some cases, these persuasive attempts elicit little or no thought, whereas in others, they manage to evoke more thoughtful consideration. *Elaboration* refers to the extent of thoughtful processing an individual directs toward an attitude object or issue, including their scrutiny of the information contained in a persuasive message or retrieved or generated from memory. A core prediction of contemporary models of persuasion (Chaiken, 1987; Kruglanski & Thompson, 1999; Petty & Cacioppo, 1986) is that an individual's extent of thoughtful processing about an object or issue is a key determinant of whether his or her resulting attitude will be strong or weak (Petty, Haugtvedt, & Smith, 1995). This distinction is important as strong attitudes are more consequential than weak attitudes – that is, they are more durable and impactful. Indeed, compared to their weak counterparts, strong attitudes tend to be more persistent over time and resistant to persuasion, and they tend to exert more influence over behavior and processing (Krosnick & Petty, 1995). Researchers have identified a number of strength dimensions that reliably predict which attitudes tend to exhibit these consequences, including attitude certainty, attitude accessibility, attitude importance, and attitude-relevant knowledge, among others.

Understanding the relationship between elaboration and attitude strength provides an answer to a key question for would-be persuaders – specifically, what determines whether attitude change will be consequential? Some aspects of the relationship between elaboration and attitude strength are well understood, whereas others remain to be explored. Over 15 years ago, Petty et al. (1995) proposed a general framework for the relationship between elaboration and attitude strength, so we begin by reviewing the growing evidence supporting this framework. Then, the primary objective of this article is to lay out a new perspective on

the relationship between elaboration and attitude strength, to review existing support for it, and to chart out future directions. In particular, we propose that a *meta-cognitive path* exists from the extent of elaboration (A) to attitude strength consequences (D), which can be explained by the perceptions individuals form of their own processing (B) and the influence of these perceptions on attitude strength dimensions (C) (see Figure 1). The growing evidence surrounding attitude certainty will be our focal point, but we also discuss implications for other dimensions of attitude strength.

Elaboration and Attitude Strength

Elaboration can come from many sources that shape a person's motivation and/or ability to process thoughtfully. For instance, contextual variables such as personal relevance and distraction can temporarily influence the motivation and ability to think, respectively, as can individual differences in need for cognition and issue-relevant knowledge (for reviews see Clark, forthcoming; Petty & Wegener, 1998). To gauge elaboration, researchers traditionally have used one of two general approaches: (i) measuring the thoughts people have or assessing the consequences of those thoughts and (ii) assessing meta-level *perceptions* of the amount of thought that has taken place (Wegener, Downing, Krosnick, & Petty, 1995). The first approach includes thought-listing procedures (Petty & Cacioppo, 1977) and argument quality manipulations (Petty, Wells, & Brock, 1976). Greater elaboration is indicated when participants list more thoughts about the message or attitude object, when the favorability of thoughts corresponds more closely to the attitude itself (i.e., the attitude–thought valence correlation is high), or when participants show greater discrimination between strong and weak arguments in their post-message attitudes. In contrast, a second approach to assessing elaboration uses self-report items that tap perceptions of how many thoughts one has had or how much effort one has expended in considering a message or attitude object (Wegener et al., 1995). This type of perception reflects a secondary thought in that it is a thought about a thought – in this case, a thought about how much thought one has engaged in – making it a type of meta-cognition. New developments in the area of meta-cognition suggest that the distinction between primary and secondary thoughts can have important consequences, particularly when contextual factors lead perceived (secondary) thought to diverge from actual (primary) thought (Petty, Briñol, Tormala, & Wegener, 2007).

A surprisingly small number of studies have simultaneously included assessments of elaboration and measures of attitude strength consequences (i.e., $A \rightarrow D$), but findings in this area generally suggest that more elaboration leads to greater attitude strength. For example, Petty, Cacioppo, and Schumann (1983) found evidence of greater argument quality effects (indicating greater elaboration) and attitude–behavior consistency (indicating greater attitude strength) under high compared to low personal relevance conditions. Haugtvedt and Wegener (1994) found increased thought–attitude correlations (indicating greater elaboration) and resistance to persuasion (indicating greater attitude strength) under high compared to low

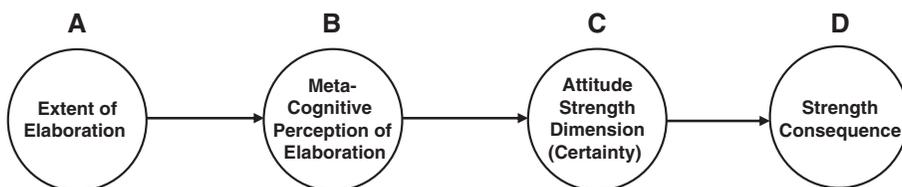


Figure 1 Causal chain from amount of elaboration, or information processing, to attitude strength consequences.

personal relevance conditions. Similarly, Haugtvedt and Petty (1992) presented participants with a positive persuasive message and found more positive thoughts, greater thought–attitude correlations, and greater persistence among high compared to low need for cognition recipients. Thus, these studies supported the role of elaboration in three primary strength outcomes: attitude–behavior correspondence, resistance to persuasion, and persistence over time. However, the most direct evidence, placing measures of elaboration in the mediating role, has only come to light quite recently. Blankenship and Wegener (2008) provided such evidence by developing a within-participant argument quality manipulation, whereby a message contains both strong and weak arguments and thoughtful processing is indicated when judgments specific to the strong as opposed to weak arguments differ. In one study, individual participants who were led to see the topic as high as opposed to low in value importance showed greater differentiation between their responses to the strong and weak arguments presented (greater elaboration) and were more resistant of a subsequent persuasion attempt (attitude strength consequence). Furthermore, mediation analysis showed that extent of elaboration explained the impact of value importance on resistance. This investigation, along with two contemporaries reviewed below (Barden & Petty, 2008; Smith, Fabrigar, MacDougall, & Wiesenhal, 2008), solidified elaboration as a causal mechanism responsible for attitude strength.

Possible mechanisms

Petty et al. (1995) proposed four potential mediating processes that further explained the relationship between elaboration and attitude strength consequences (i.e., resistance, persistence, and attitude–behavior correspondence): knowledge acquisition, structural consistency, attitude accessibility, and attitude certainty. After a brief review of the evidence for each of these mechanisms, the current chapter will focus on certainty, which has received the bulk of the attention in recent years.

Knowledge acquisition. Working knowledge refers to the information – for instance, the previous experiences and attitude-relevant beliefs – that comes to mind when people think about their attitudes or encounter an attitude object (Wood, Rhodes, & Biek, 1995). As a process driving the relationship between elaboration and attitude strength, the argument is that as people think more about an object or issue, more working knowledge is acquired or activated, which strengthens people’s attitudes. Correlational evidence is consistent with the notion that working knowledge might mediate the link between elaboration and attitude strength. For instance, elaboration predicts both the amount of information people share in a knowledge listing task and people’s self-reported perceptions of their own knowledge, both of which are associated with attitude persistence, resistance, and prediction of behavior (Davidson, Yantis, Norwood, & Montano, 1985; Kallgren & Wood, 1986; Wood, 1982). However, in most studies, knowledge has been measured rather than manipulated, so knowledge could be confounded with other dimensions of attitude strength such as attitude accessibility, certainty, and extremity (Bassili, 1996; Krosnick, Boninger, Chuang, Berent, & Carnot, 1993).

Structural consistency. Structural consistency is a broad term referring to the extent to which different elements of an attitude are in line with each other. It encompasses evaluative–cognitive consistency, evaluative–affective consistency, cognitive–affective consistency, and attitude ambivalence. In general, greater structural consistency results in greater attitude strength, as defined by strength consequences (Chaiken, Pomerantz, & Giner-Sorolla, 1995). For example, attitude ambivalence, probably the most widely studied consistency variable in this domain,

predicts attitude persistence, resistance to attack, and influence on behavior (see Conner & Sparks, 2002, for a review). As a contributor to the effect of elaboration on attitude strength consequences, the notion is that the more a person thinks about his or her attitude, or a persuasive message, the more his or her thoughts (and feelings) will tend to be reconciled such that they fall in line with each other to form a coherent summary assessment of an object. This alignment, in turn, theoretically should foster attitude strength.

As it turns out, the impact of elaboration on structural consistency depends on the content of one's thoughts. When thoughts are predominantly positive or negative, elaboration tends to increase structural consistency and attitude strength. In an early example, Petty, Harkins, and Williams (1980) varied elaboration by telling participants that they were either the only person responsible (high elaboration) or one of ten people responsible (low elaboration) for evaluating a proposal. When that proposal contained strong arguments that elicit positive thoughts, greater responsibility produced an increase in those positive thoughts, resulting in more extreme positive attitudes. When weak arguments were presented, which elicit negative thoughts, greater responsibility produced an increase in those negative thoughts, resulting in more extreme negative attitudes. So, increasing elaboration produced thoughts and attitudes that were higher in structural consistency. Furthermore, recent research suggests that greater thought in one direction or another (positive or negative) is associated with increased attitude extremity, certainty, accessibility, and importance (Conway et al., 2008). However, when people have a mix of positive and negative thoughts, increasing elaboration can *decrease* structural consistency. Accordingly, Conway et al. (2008) found that increasing elaboration under mixed thought conditions can produce a decrease in extremity, certainty, accessibility, and importance. Thus, the effect of elaboration on attitude strength through structural consistency is complicated by the fact that elaboration can increase or decrease structural consistency, depending on whether thoughts are predominantly of one valence or of mixed valence.

Attitude accessibility. Attitude accessibility refers to how quickly an attitude comes to mind in the real or imagined presence of the attitude object (Fazio, 1995). One common view of the elaboration and attitude strength relation is that the more one thinks about an attitude or attitude object, the more salient or accessible that attitude, and the thoughts and beliefs upon which it is based, will become (Fazio & Zanna, 1978). This increased accessibility, in turn, will increase the likelihood that the attitude will guide behavior and that the individual will defend the attitude (resistance) or rely on it over time (persistence). Consistent with this view, manipulated antecedents of elaboration (e.g., personal relevance and untrustworthy sources) have been shown to influence the accessibility of attitudes (Kokkinaki & Lunt, 1999; Petty et al., 1995; Priester & Petty, 2003). Kokkinaki and Lunt (1999) found that when product information was processed under high (versus low) personal relevance, through instructions to attend carefully to the information, attitudes toward that particular product were more accessible. Priester and Petty (2003) provide more complete evidence, by showing that manipulating elaboration, through source trustworthiness, produced both more message processing and more accessible attitudes. Moreover, considerable evidence indicates that attitude accessibility predicts attitude persistence, resistance to persuasion, and attitude-behavior correspondence (Bassili, 1996; Fazio, Chen, McDonel, & Sherman, 1982; Fazio & Williams, 1986). In short, three experimental studies have shown that manipulating elaboration can affect attitude accessibility, and other evidence suggests that accessibility has strength consequences. Thus, there is reason to suspect that attitude accessibility is a plausible mediator of the impact of elaboration on strength consequences.

Attitude certainty. Among the various dimensions of attitude strength that have been studied, *attitude certainty* has received the most attention in relation to elaboration (see Petty et al., 1995; Tormala & Rucker, 2007, for reviews). Attitude certainty refers to the conviction behind an attitude or the level of confidence and surety one has about it (Abelson, 1988; Gross, Holtz, & Miller, 1995). As a meta-cognitive state, certainty typically is assessed using scale items measuring how certain, confident, and sure an individual is of his or her attitude (Wegener et al., 1995; see Petrocelli, Tormala, & Rucker, 2007, for further refinements). Of importance, this state is conceptually distinct from attitude valence and extremity. Indeed, two individuals could hold attitudes toward an object that appear to be identical in terms of valence and extremity (e.g., moderately favorable for each of them) but differ in how certain they are of those attitudes. An extensive body of research has shown that attitude certainty predicts attitude strength consequences including attitude persistence, resistance, and prediction of behavior and choice (C → D; see Bassili, 1996; Petty et al., 2007; Tormala & Rucker, 2007).

Interestingly, attitude certainty differs from knowledge acquisition, structural consistency, and accessibility in that it is inherently meta-cognitive. That is, it is a secondary thought (“I am certain”) about a primary thought (the attitude itself; e.g., “this policy is good”). Not surprisingly, because attitude certainty is a meta-cognitive construct, its inputs largely are meta-cognitive as well (Rucker, Tormala (In Press), Petty, & Briñol,). In the current context, although there is little direct evidence for the notion that the amount of actual elaboration (e.g., argument quality effects and number of thoughts) is associated with attitude certainty, certainty has consistently been linked to the *perception* of elaboration, a meta-cognition. For example, Krosnick et al. (1993) found that perceived elaboration and attitude certainty were generally correlated across a variety of different attitude objects. In a recent study, Smith et al. (2008) manipulated the level of distraction (antecedent of elaboration) and found that it affected both perceived elaboration and attitude certainty and that perceived elaboration mediated the relationship between distraction and certainty (see also Barden & Petty, 2008). Based on these kinds of findings, we submit that it is worth considering a new meta-cognitive account for the effect of elaboration on attitude strength.

A new meta-cognitive perspective

In essence, we propose that unlike the knowledge, structural consistency, and accessibility accounts proposed by Petty et al. (1995), the effect of elaboration on strength consequences through attitude certainty requires a meta-cognitive intermediary – specifically, the perception that one has elaborated more and the simultaneous belief that more elaboration leads to more accurate assessments. Barden and Petty (2008) pointed out that people are often cognizant of the amount of thoughtful processing they have engaged in on a topic through a variety of cues, such as noticing the number of thoughts that have passed through their mind or that have been expressed in conversation or reflecting on the amount of time spent in thought. Consequently, the extent of actual elaboration can rise to awareness and influence *perceptions* of elaboration. Barden and Petty observed that greater perceived thought is often associated with more certainty, whereas less perceived thought is often associated with doubt. For example, authority figures from judges to parents often communicate certainty by prefacing decisions with references to thoughtfulness (e.g., “Having given it a lot of thought, I am quite sure that...”). On the other hand, claiming little thought tends to be used to express doubt (e.g., “I’m not sure; I haven’t had a chance to think much about that yet.”). Barden and Petty proposed that these associations could produce a

thoughtfulness heuristic, whereby if more thought is seen as going into a judgment, that judgment is believed to be more correct. Together, perceptions of the extent of elaboration and the thoughtfulness heuristic provide an explanation for how actual elaboration can come to influence attitude certainty ($A \rightarrow B \rightarrow C$).

Across several studies, Barden and Petty (2008) found evidence of a complete process driving the effect of antecedents of elaboration on attitude strength consequences ($A \rightarrow B \rightarrow C \rightarrow D$). Moreover, the role of the thoughtfulness heuristic was validated in two studies testing well-documented antecedents of elaboration: individual differences in need for cognition (NC; Cacioppo & Petty, 1982, see Cacioppo, Petty, Feinstein, & Jarvis, 1996, for a review) and manipulated distraction (Harkins & Petty, 1981; Petty et al., 1976). In the distraction study, participants listened to a persuasive message for wireless networks on campus. At the same time, either they were asked to provide 66 typed responses to visual stimuli (distraction condition) or they were told they would complete that task later (control). Distraction influenced actual elaboration (based on a thought and memory listing), perceived elaboration, and attitude certainty. Participants showed evidence of greater elaboration, perceived elaboration, and attitude certainty in the no-distraction rather than distraction condition. Moreover, because attitudes were uniformly positive toward wireless networks, increased attitude certainty was expected to increase favorable behavior intentions. Consistent with this hypothesis, greater certainty in the no-distraction condition led participants to be more willing to vote, sign a petition, and add their name to a list in support of wireless networks. In a second and similar study, NC also predicted extent of actual elaboration, perceived elaboration, and attitude certainty.

In both studies, structural equation analyses showed good fit for models containing each step of the proposed causal sequence (e.g., distraction to actual elaboration to perceived amount of thought to attitude certainty to behavioral intentions). Furthermore, alternative models failed to find support for the possibility that perceived and actual elaboration serve as competing parallel mediators or for the possibility that perceived processing came before actual processing in a single causal sequence. In short, Barden and Petty (2008) provided the first evidence for a comprehensive process from actual elaboration to strength dimensions and consequences ($A \rightarrow B \rightarrow C \rightarrow D$), a long-held prediction in the persuasion literature.

Of importance, the thoughtfulness heuristic holds that *perceived* amount of processing is a proximal cause of attitude certainty. One implication of this tenet is that *any* factor influencing perceived elaboration could affect attitude certainty independent of its association with the actual extent of thought. Thus, in two follow-up studies, Barden and Petty (2008) used common contextual manipulations (social comparison and test success/failure) to explore whether perceived processing, in the absence of actual processing differences, would influence attitude certainty. In one study, participants completed a quiz that they were told assessed how much they had thought about a persuasive message they had received. When the quiz was rigged for success as opposed to failure, participants reported greater perceived thought, more attitude certainty, and increased (attitude-consistent) behavioral intentions. A second study showed that false social comparison information – specifically, feedback that the participant had generated two more or two fewer thoughts than prior participants – also influenced perceived processing and attitude certainty. In both studies, the sequential mediation model fit the data well, with the perceived elaboration manipulation predicting perceived amount of processing, attitude certainty, and (in the first study) behavior intentions. Also important, alternative process variables such as mood, knowledge, importance, attitude extremity, and ambivalence showed no effects. These studies therefore revealed that contextual factors that influence perceived processing

can hijack the thoughtfulness heuristic and have consequences for attitude strength, completely independent of any differences in actual elaboration.

In essence, Barden and Petty (2008) uncovered a robust effect of perceived elaboration on attitude certainty and showed that this effect can occur even when actual elaboration does not vary. In subsequent work, researchers have identified additional variables, including regulatory depletion and perceived time spent evaluating, that can influence attitude certainty through their effect on meta-cognitive perceptions of processing. Wan, Rucker, Tormala, and Clarkson (2010) examined the effect of regulatory depletion on attitude certainty. Wan et al. hypothesized that although actual elaboration might sometimes be greater under low compared to high depletion conditions, *perceived* elaboration might show the opposite tendency. The logic was that depletion can create a kind of mental fatigue that is misattributed to thorough information processing. If true, people ironically might show greater attitude certainty following persuasive messages received under high rather than low depletion conditions, because they *believe* that they processed the messages more thoroughly under those conditions.

To test this possibility, Wan et al. (2010) conducted a series of studies in which participants were presented with advertisements under conditions of high or low regulatory depletion. For instance, in an initial experiment, participants in a depletion condition engaged in a 6-min writing task in which they were instructed to think of and write about anything except a white bear (see Vohs & Faber, 2007). In a second experiment, participants in the depletion condition were instructed to read a passage of text and cross out the letter “e” each time it appeared as long as a set of complicated rules were met (e.g., the “e” was not within one or two letters from another vowel). Participants in the control conditions were given similar but less depleting tasks. Following these tasks, all participants read an ad for a new product and then reported their attitudes, attitude certainty, and perceived elaboration. Across studies, participants reported greater attitude certainty under high compared to low depletion conditions, and this effect was mediated by perceived elaboration. As hypothesized, then, more depletion fostered more perceived elaboration, which led to greater certainty. Wan et al. also found that increased certainty had behavioral implications, leading to more attitude-consistent behavior. Thus, the B → C → D sequence was observed in these studies, but in this case, B (perceived elaboration) was derived from greater cognitive depletion rather than greater cognitive processing of the focal messages.

Naïve theories

The findings summarized to this point hinge on an underlying lay belief or naïve theory that greater thought produces better judgment (e.g., a more correct attitude). This provides a basis for more perceived thought producing greater attitude certainty. If a different naïve theory is held, however, the effect of elaboration on attitude certainty might change. Indeed, if under some conditions, people believe that less thought is a good thing – perhaps because too much thought could lead one astray or suggest that an accurate assessment is difficult to reach – the effect of perceived elaboration on certainty might reverse.

As noted already, perceptions of the extent of elaboration that has taken place can be influenced by cues such as time spent thinking and the number of thoughts one has had. Tormala, Clarkson, and Henderson (2011) explored the effect of perceived processing time on attitude certainty. More specifically, Tormala et al. tested the effect of perceiving that one has spent very little or very much time evaluating an object or issue. Although processing or evaluation time maps imperfectly onto elaboration – indeed, an individual might spend more

time evaluating a message because she is processing it deeply or because he or she is distracted or his or her mind is wandering – it seems reasonable to submit that, all else equal, more time spent processing generally reflects greater processing activity. Interestingly, though, past research has been somewhat divided as to whether more or less evaluation time fosters greater attitude certainty. Some past research appears to show that less processing time is associated with greater certainty, for example, that attitudes that are highly accessible and come to mind with seemingly little deliberation are held with more certainty (e.g., Bizer, Tormala, Rucker, & Petty, 2006; Fazio, 1995). However, other studies appear to show that more processing time produces greater certainty; for example, having more time to counterargue a message or form an impression can foster greater attitude or judgment certainty (e.g., Tormala, Clarkson, & Petty, 2006; Willis & Todorov, 2006).

Tormala et al. (2011) sought to gain some clarity into these potentially disparate findings by identifying the conditions under which each effect held. In a series of studies, participants considered their attitudes toward an object or issue and reported it whenever they were ready. Once participants had reported their attitudes, they received false feedback that they had taken more or less time to evaluate the topic than most other participants, after which they reported their attitude certainty. Across studies, Tormala et al. found evidence for both less and more evaluation time fostering greater certainty, depending on specifiable conditions. For instance, when participants were focused on forming their attitudes and/or evaluating unfamiliar objects (e.g., a painting that they had never seen before), they showed greater attitude certainty in the more-time rather than less-time condition. When participants were focused on expressing their attitudes and/or evaluating *familiar* objects (e.g., a painting that they had seen before), however, they showed the opposite effect – that is, more certainty in the less-time rather than more-time condition. Of course, perceiving that one has taken more time to express an attitude is not the same thing as perceiving greater elaboration. Thus, in a final study linking evaluation time to perceived amount of thinking, participants self-reported their own level of trust in thoughtful analysis versus gut reactions. Results indicated that “thoughtful analysis” participants were more certain when they believed that they spent more rather than less time evaluating, whereas “gut-reaction” participants showed the opposite effect. This research thus showed that the same elaboration cue – in this case, time spent processing an object or issue – can either increase or decrease certainty depending on which lay belief is used.

In short, past research provides convergent evidence for the notion that elaboration is a key determinant of attitude certainty. Furthermore, meta-level perceptions of elaboration can serve as a proximal mechanism capable of directly determining certainty. What we are now beginning to learn is that the relationship between cues to the extent of elaboration and attitude certainty is malleable. Depending on what lay beliefs or naïve theories people bring to bear in a given situation, it is possible that greater perceived elaboration can foster more or even less attitude certainty if it sends a different signal regarding the likely validity or correctness of one’s reported opinion.

Types of processing

Going beyond differences in the amount of processing in which people have engaged (or perceive that they have engaged), attitude certainty also has been linked to distinctions in the *type* of processing applied to an attitude object or issue. We will highlight two such distinctions here: online versus memory-based processing and affective versus cognitive processing.

Bizer et al. (2006) examined the effect of online versus memory-based processing on attitude strength. In short, *online processing* refers to the active formation, integration, and updating of evaluations as information is received, whereas *memory-based processing* refers to the more passive reception of information, which is later retrieved from memory and consolidated into an evaluation when a judgment is required (Hastie & Park, 1986). Of greatest interest to Bizer et al. (2006) was whether online versus memory-based processing had implications for attitude certainty. And indeed, across three different studies, they found that people held their attitudes with greater certainty and displayed greater attitude-choice and attitude-behavior consistency when they formed those attitudes in an online rather than memory-based fashion. These effects held even after controlling for attitude accessibility.

Although the online versus memory-based processing distinction relates more to processing style than processing amount, there are some indications that online processing leads people to be more thorough or elaborative in their processing. For instance, people have been shown to have better recall of information evaluated in an online rather than memory-based fashion (e.g., Tormala & Petty, 2001). Nevertheless, both deep and shallow processing can occur either online as the information is received or post hoc during memory retrieval. The key question from the current perspective is whether people might *perceive* their processing to be more thorough when it occurs in an online versus memory-based fashion. Bizer et al. (2006) speculated that this might be the case, but future research that directly controls for processing extent or that orthogonally manipulates perceived amount of processing (high versus low) and actual type of processing (online versus memory-based) would be worthwhile. Such research could also explore the role of naïve theories to determine if, for instance, people have different theories about how much they have processed or what their processing means depending on the type or timing of that processing (i.e., during encoding or subsequent retrieval).

The distinction between attitudes based on affective versus cognitive processing also has been linked to attitude certainty. As brief background, *affect-based processing* involves associations between the attitude object and feelings, emotions, and moods, whereas *cognition-based processing* involves developing associations between the attitude object and thoughts, beliefs, and traits (McGuire, 1969). For instance, Fabrigar and Petty (1999) created cognitive or affective attitudes toward a fictitious animal by giving participants information about the animal that was descriptive and factual in nature (e.g., its impact on local ecosystems) or more arousing and emotional (e.g., a firsthand account of a gory attack by this animal). Although most of the research on this topic has sought to understand the implications of the affective–cognitive distinction for openness to persuasion from affective versus cognitive messages, there is some evidence that it also influences attitude certainty. For example, Edwards (1990) induced affect-based attitudes by priming a smiling face and cognition-based attitudes by providing textual information. Edwards and von Hippel (1995) gave male participants either an attractive photo of a woman they were about to interview or a positive set of her written interview responses. In both investigations, affect-based attitudes tended to produce greater certainty than cognition-based attitudes. Though speculative, one potential explanation for this effect might be that the affect-based condition in these studies elicited deeper or more extensive processing (e.g., perhaps people felt more interested in the affect rather than cognition conditions) and, therefore, greater attitude certainty. It also is possible that the certainty effect stems from differences in attitude accessibility (see Fazio, 1995), but this too might ultimately link to meta-cognitive perceptions of processing. Future research delving further into this relationship would be worthwhile.

In addition, it would be interesting to explore whether people's perceptions of the affective versus cognitive nature of their processing predicts their perceived *amount* of processing and, if so, what effect this would have on attitude certainty. See, Petty, and Fabrigar (2008) found that individuals form general perceptions of the extent to which their attitudes are based on affect as opposed to cognition, which are distinct from their actual structural bases. Applying this distinction in the current context could help expand our understanding of people's diverse perceptions of their own processing and how those perceptions shape or map onto attitude certainty and attitude strength consequences.

Conclusion

The relationship between elaboration and attitude strength was first predicted decades ago. Nevertheless, we are just now starting to understand the different mechanisms responsible for these effects and the circumstances in which they take place. As we have reviewed, in a growing number of cases, meta-cognitive variables have filled in gaps in our understanding of the mechanisms responsible for important and previously documented effects. Bassili (1996) first noted that attitude strength variables could be differentiated in terms of those that are structural ("operative," in his words) and those that are meta-cognitive (or "meta-attitudinal"). Interestingly, in Bassili's work, structural dimensions of strength such as attitude accessibility or knowledge were proposed to be more important, or at least more reliable, determinants of strength outcomes such as resistance to persuasion and persistence over time (though in his analysis, attitude certainty performed quite well in predicting these outcomes). Our review underscores the importance of distinguishing between structural and meta-cognitive variables in this domain, but we submit that meta-cognitive factors often are the most proximal or direct determinants of attitude strength. In particular, the evidence supports this view of the effect of elaboration on attitude certainty.

Going forward, we think it is important to revisit the other, more structural mechanisms proposed for the effect of elaboration on attitude strength to determine whether meta-cognitive processes might play a role as well. Consider knowledge acquisition. It could be that the effect of elaboration on strength consequences through working knowledge is driven, at least in part, by perceived knowledge, which can rise and fall in the absence of changes in actual knowledge (e.g., Tormala & Petty, 2007). Similarly, structural consistency effects could be mediated by perceived consistency, and attitude accessibility effects on attitude strength outcomes could stem from changes in the perceived ease of retrieving, expressing, or otherwise using one's attitude. In future studies, we hope researchers will explore these potential meta-cognitive channels for the effects of elaboration on attitude strength.

For now, one key implication of the current review is that meta-cognitive variables can influence attitude strength completely independent of any structural or "cognitive" (i.e., primary thought) differences. Meta-level variables also provide an opportunity to explain little-understood moderators – for instance, the notion that holding different naïve theories produces opposing effects in this domain, which would be unlikely if the effects were purely structural in nature. Exploration of meta-level variables has provided a more complete understanding of the role of the amount of processing in determining attitude strength. As research into different *types* of processing increases (e.g., online versus memory based and affective versus cognitive), we anticipate fascinating insights into persuasion processes and their outcomes, and we hope to learn more about the dynamic interplay between objectively different modes of processing, subjectively different perceptions of processing, and their implications for strength-related outcomes.

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 meta-cognition in these domains. Dr Tormala has published numerous journal articles and chapters exploring the role of meta-cognitive factors in attitude formation, maintenance, and change.

Jamie Barden is an Associate Professor in the Department of Psychology at Howard University. After earning a BA from Grinnell College, he received his PhD in Social Psychology from Ohio State University in 2005 and joined the faculty at Howard University. His research reflects two themes: the diverse processes underlying evaluative judgments, from the least thoughtful automatic processes to the most thoughtful meta-cognitive processes, and the processes and biases that result from placing the self and others into social categories. Dr Barden has published articles in leading journals and chapters in edited books. He is an Associate Editor at *Basic and Applied Social Psychology*, and his research is funded through the National Science Foundation.

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