






Attitude Strength: What's New?

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Abstract. Attitude strength (what makes attitudes durable and impactful) has become an important topic in the domain of social influence. We review three areas in which the traditional view of attitude strength has been modified or updated since the publication of Petty and Krosnick's 1995 edited book on the topic. First, although it was widely assumed that there were different categories of strength variables (i.e., operative versus meta-cognitive), it may now be better to recognize that each strength property can be measured both structurally and subjectively and that each measure is useful. Second, although scholars assumed that virtually all persuasion techniques would work better on weaker than stronger attitudes, recent research suggests that some techniques might actually work better on stronger than weaker attitudes. Third, although stronger attitudes often guide behavior better than weaker ones, when strength is challenged or weak attitudes are threatening, people can be motivated to act to demonstrate or restore certainty. This can result in weaker attitudes leading to more extreme behavior.

Received 21 November 2022; Revised 18 February 2023; Accepted 15 March 2023

Keywords: attitude strength, certainty, extremism, persuasion

Despite the longstanding status of *attitudes* as the most indispensable concept in social psychology (Allport, 1935), it has had a troubled history in regard to its predictive power (e.g., Wicker, 1971). That is, although there is widespread agreement that attitudes refer to a person's general evaluations (e.g., good-bad) of objects, issues, and people (e.g., Petty & Cacioppo, 1981; Thurstone, 1928), research has not always supported the seemingly obvious notion that people's overall attitudes (e.g., supporting the environment) would guide their actions (e.g., recycling cardboard boxes; Weigel & Newman, 1976). Thus, some social psychologists turned to the notion that some attitudes were more consequential than others. For example, Festinger (1957) pointed to attitude *importance* as one such moderating variable in his wide-ranging theory of cognitive dissonance. Attitude importance remains a relevant concept in the literature today (Howe & Krosnick, 2017).

The notion that some attitudes could be more consequential than others has also been popular in fields outside of social psychology, especially among survey

researchers in sociology and political science (e.g., Sample & Warland, 1973; Schuman & Johnson, 1976). By the late 1980s, social psychologists had coalesced around calling this difference in attitudes, *attitude strength*, but as Raden (1985) noted, this term was "not defined with any precision" and it did "not appear to have any agreed-upon meaning" (p. 312). A decade later, Krosnick and Petty (1995) defined attitude strength in terms of its consequences. That is, attitude strength (much like strength in a person) was defined in terms of what makes attitudes "durable and impactful." This definition has attained considerable acceptance (e.g., Luttrell & Sawicki, 2020). In this definition, durability referred to the extent to which an attitude persisted over time and resisted change. Impact referred to whether an attitude influenced other judgments, information processing, and behavior.

This definition, however, did not address the question of what it is that determines whether attitudes are indeed durable and impactful. As this review will make clear, the response to this question is more complex than the simple definition of strength might suggest. For example, in an early paper, Scott (1968) identified 10 ways in which attitudes could differ besides their overall positivity/

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Funding Statement: This research received no specific grant from any funding agency, commercial or not-for-profit sectors.

Conflicts of Interest: None

Data Sharing: N/A

How to cite this article:

Petty, R. E., Siev, J. J., & Briñol, P. (2023). Attitude strength: What's new? *The Spanish Journal of Psychology*, 26, e4. Doi:10.1017/SJP.2023.7

negativity. Some of these attitude properties have received considerable research attention over the years as strength features of attitudes (e.g., ambivalence), but others have not been studied much at all (e.g., overtness). Still other strength features of attitudes that have become very popular over time were completely ignored by Scott (e.g., attitude certainty). Subsequently, Raden (1985) and Krosnick and Petty (1995) referred to some of these attitude *properties* as attitude-strength *dimensions, attributes, and/or aspects*. Luttrell and Sawicki (2020) referred to them as *predictors* of strength to distinguish them from the “defining features.”¹ Regardless of the label applied, scholars agree that many of these measurable aspects of attitudes are linked to strength outcomes in some way, usually in one direction (e.g., more certainty is associated with greater strength consequences), but as described shortly, sometimes the direction can be reversed.

Research on the various strength attributes occurred mostly in isolation for many years culminating in an edited volume on strength (*Attitude Strength: Antecedents and Consequences*, Petty & Krosnick, 1995) in which a variety of authors reviewed research on their favored strength dimension. A primary goal of the current article is to review what was assumed about attitude strength around the time of this 1995 book, and then specify some key advances in understanding since then. Although research on attitude strength has become a vast enterprise with much interesting work being conducted, our brief review focuses primarily on what we see as some of the most critical differences in assumptions now versus then.

We begin, however, with an assumption that has not changed. That is, by 1995, numerous researchers aimed to address the question of whether attitude strength features constituted one overall strength factor (i.e., the various properties were correlated with each other forming a unified construct), or whether there were several factor clusters, or perhaps every identified strength property was unique in some way. In 1985, Raden concluded that it is “far from certain that attitude strength is a global, unitary property,” (p. 312). Since then, a number of researchers have proposed different ways of clustering the various attitude strength dimensions (e.g., Abelson, 1988; Erber et al., 1995; Phillip-Muller et al., 2020; Pomerantz et al., 1995; see Visser et al., 2006, for a review), but no one approach to clustering has achieved consensus or dominated the literature. Thus, we suggest that Krosnick and Petty’s (1995) conclusion that “the various attributes of attitudes that may contribute to strength are best thought of as distinct from one another” (p. 17), remains valid today.²

¹We use all of these terms interchangeably.

²One important reason Krosnick and Petty favored the independent constructs view was that some research had clearly shown that the

Identifying and Measuring Attitude Strength Indicators

New Strength Indicators

Although we noted that it still seems best to treat the numerous attitude strength indicators as conceptually and empirically distinct, there has been some progress in identifying *new* attitude strength indicators and in conceptualizing the measurement of the various strength dimensions. In the Petty and Krosnick (1995) volume, the dimensions of strength covered in one or more chapters were: Accessibility, certainty, elaboration, extremity, importance, involvement, knowledge, and structural consistency. Perhaps the most studied *new* dimension of strength identified since then is the extent to which the attitude is based in one’s morals (Skitka et al., 2005). This strength feature has been linked to nearly all of the strength consequences of interest (e.g., morally based attitudes tend to be more resistant to change than attitudes based in practicality; see Skitka et al., 2021).

Another dimension is whether the attitude is more based on affect or cognition. Although this is a long-studied feature of attitudes (e.g., Rosenberg & Hovland, 1960), it is only relatively recent evidence that suggests it is a strength property (e.g., affectively based attitudes are more accessible and less likely to change over time than cognitively based attitudes; Giner-Sorolla, 2004; Rocklage & Luttrell, 2021). Three other dimensions that are gaining traction as strength properties include whether the attitude is self-defining, linked to one’s identity, or based more in negativity than positivity. That is, attitudes and choices that are tied to one’s sense of self (Zunick et al., 2017), linked to a particular group identity (Xu & Petty, *in press*), and based more on opposition to one’s non-preferred option than support for one’s preferred option (Bizer & Petty, 2005) appear to be stronger, at least in some circumstances (cf., Catapano & Tormala, 2021; Lee et al., 2022).

Two Methods of Measuring Strength Indicators

With respect to measuring the various strength properties that have been identified, perhaps the most influential proposal in the late 1990s stemmed from John Bassili (1996) who categorized the measurement of strength dimensions into what he called *operative* and *meta-cognitive* approaches (see also Wegener et al., 1995). In essence, meta-cognitive properties were assessed with subjective impressions of one’s attitudes. For example, people would be asked if they were *certain* of their opinions, or if an attitude was *important*. In contrast,

different dimensions of strength could interact with each other in predicting outcomes (e.g., Tourangeau et al., 1989).

operative properties were those aspects of attitudes that were assessed with more objective and structural measures. For example, a researcher could measure how quickly an attitude came to mind for *accessibility* or how much *knowledge* a person was able to list about the attitude object. The different strength properties were then categorized as to whether they were typically assessed with subjective reports (e.g., certainty), making them meta-cognitive, or more objective measures (e.g., accessibility), making them operative. Furthermore, Bassili argued that “operative measures of attitude strength have an advantage in gauging the strength of an attitude” (p. 638). Meta-attitudinal properties were not viewed as useful because they lacked a structural basis (i.e., “impressions of attitudes are seldom represented in memory,” p. 638).

In contrast to considering some strength dimensions as operative and others as meta-cognitive, an alternative approach is to recognize that many of the strength dimensions can be and have been measured with both kinds of assessments. For example, knowledge has been assessed by asking people how much knowledge they believed they possessed (subjective) and also by measuring the amount of knowledge they could list (objective; Davidson et al., 1985). Ambivalence has been assessed both by measuring how many positive and negative reactions people have to an attitude object (objective measure; Kaplan, 1972) and also by asking them how conflicted they feel about the object (subjective measure; Priester & Petty, 1996). Furthermore, dimensions that Bassili identified as operative can and have been assessed with subjective measures. For example, attitude accessibility, typically assessed with a reaction time procedure (Schuette & Fazio, 1995), has also been measured by asking people to report how quickly their attitude comes to mind (Tormala et al., 2011). And, dimensions such as certainty that typically were assessed with self-reports (e.g., Petrocelli et al., 2007), could also be assessed in a more objective/structural manner. For example, in one study, Petty and colleagues (2006) used an implicit association test (IAT; Greenwald et al., 1998) to examine if the attitude object was more quickly associated with words like “confident” and “sure” rather than “doubtful” and “skeptical.”

Krosnick and Petty (1995) originally recognized that when a given dimension was assessed both subjectively and objectively, the two different methods of assessment sometimes showed very low correlations with each other, even if the outcomes were similar. Furthermore, they suggested that this lack of relation between the two measures of the same construct might reflect either: (a) That each measure assessed the same construct but imperfectly, or (b) that each measure reflected information that was “useful, valid, and independent” (p. 16). There are several lines of

more recent research that strongly support this second possibility.

One way of showing that each type of measurement of the same strength dimension might be independently useful is to disentangle them completely (i.e., break any correlation). For example, although the amount of thinking a person has done about an attitude object tends to correlate well with the perceived amount of thinking, Barden and Petty (2008) showed that the perceived amount of elaboration was sufficient to enhance attitude-behavior consistency even if it was completely dissociated from the actual amount of thinking. To demonstrate this, in one study college students read some strong arguments in favor of a new university internet policy. They then took a quiz on this message that was rigged to suggest that they performed well (an easy quiz) or poorly (a very difficult quiz). They were explicitly told that their quiz performance reflected how much they had thought about the message. Although this induction did not affect participants’ attitudes to the proposal, it did impact how much thought they believed they put into the message. Importantly, this enhanced perception of thought affected how certain they felt in their attitudes and how much they were willing to act on them even though their perception of elaboration was not linked to any actual amount of thought (see also Moreno et al., 2021, 2023).

Other ways of showing the utility of each type of measure are to: (a) Demonstrate that they can predict unique variance in a given outcome, (b) can predict the same outcome, but in different situations, and (c) can predict different outcomes. This approach was taken in a series of studies by See and colleagues (2008, 2013) examining the affective versus cognitive bases of attitudes. In particular, See and colleagues compared a traditional objective measure of the affective versus cognitive basis of attitudes (i.e., examining whether affect or cognition scales predicted attitudes better; Crites et al., 1994) with a newly developed subjective measure (i.e., simply asking people to report whether their attitudes were more affectively or cognitively based). These different measures were not correlated and each measure was shown to predict unique variance in a particular outcome (i.e., susceptibility to a persuasive message). Furthermore, each measure was shown to be better at predicting under different circumstances. For example, the subjective measure was better at predicting interest in information seeking when deliberation was high, but the structural measure was better when deliberation was low.³ Finally, each

³Subjective (meta-cognitive) measures of strength are typically more likely to operate when people have some motivation and ability to consider their meta-cognitive reflections prior to responding (e.g., Moreno et al., 2023; see Briñol & Petty, 2022, for a review).

measure was also shown to be capable of predicting different outcomes. In one study, the objective measure was associated with faster reading speed for relevant information (i.e., affective relative to cognitive information was processed faster as attitudes were more objectively affectively based), whereas the subjective measure predicted slower reading speed for relevant information. The explanation was that the objective measure was related to processing efficiency (ability) whereas the subjective measure reflected processing interest (motivation). These results clearly suggested that the different ways of assessing the same dimension could each be useful in their own right.

Given these different outcomes, See et al. (2013) suggested that it could be that subjective and objective measures of many of the traditional dimensions of attitude strength (e.g., ambivalence), when assessed with objective versus subjective measures, could also operate differently. In sum, the traditional view of objective versus subjective measures of attitude strength dimensions was either that the objective method of measurement was superior, or that if the subjective measure predicted at all, it was because the self-report reflected the underlying structural construct. However, the new view is that objective and subjective measures of the same strength dimension can each be valuable and operate via different mechanisms in different situations. Thus, although some reviewers continue to treat studies employing objective and subjective measures of the same dimension similarly because the outcomes are often similar (e.g., Luttrell & Sawicki, 2020), we suspect that in the future, more research will begin to show the utility of treating the different measures of the same dimension differently (see also, See et al., 2023).

Methods that Can Change Strong Attitudes More than Weak Ones

So far, we have seen that since the 1995 book on *Attitude Strength* was published, new dimensions of strength have been identified, and progress has been made in understanding the implications of different ways of measuring these constructs. Another area in which progress has been made is in understanding how to change strong attitudes. That is, the prevailing wisdom was that virtually all persuasion techniques would work better in changing weak rather than strong attitudes because the latter attitudes were generally more resistant to change. For example, the greater knowledge that accompanies strong attitudes would give people the ability to resist (e.g., counterargue) better and the higher certainty that accompanies these attitudes would provide higher motivation to resist. Because it was assumed that it is generally easier to change weak rather than strong attitudes, many persuasion studies have avoided

examining attitude topics for which attitudes were likely to be strong (e.g., important topics like abortion).

Using Matched Messages

In contrast to the prevailing view, the accumulated research, and especially recent research, has suggested that it is possible to influence strong attitudes with appropriate techniques. Perhaps the earliest indication that strong attitudes could be changed with a particular type of appeal came from work on influencing cognitively versus affectively based attitudes. Recall, that contemporary research suggests that attitudes based primarily on emotion tend to be stronger than attitudes based primarily on cognition (Giner-Sorolla, 2004; Rocklage & Luttrell, 2021). This would indicate that the generic persuasive message, which typically uses persuasive arguments, should work better on attitudes that were primarily cognitively rather than affectively-based. Thus, it was noteworthy when Edwards (1990) proposed that perhaps affectively-based attitudes could be changed more easily than cognitively-based attitudes if an emotional message was used. More specifically, the proposal was that persuasion would be best when the message was congruent with (or matched) the basis of the attitude.

This matching technique was originally shown to be effective in the domain of changing attitudes with different functional bases (e.g., using a self-image-oriented message to change an attitude based on social concerns; Snyder & DeBono, 1985; see Teeny et al., 2021, for a review of matching effects in persuasion). Indeed, Edwards was able to show that for an affectively-based (relatively strong) attitude, an affective message produced even more change than for the cognitively-based (relatively weak) attitude. Since the original research, this matching effect has been replicated consistently (e.g., Fabrigar & Petty, 1999; See et al., 2008), though there are some exceptions (Clarkson et al., 2011; Millar & Millar, 1990).

One reason that matching can work better than mismatching is that the match can motivate or enable people to think more carefully about the message than a mismatch (e.g., DeBono & Harnish, 1988; see Teeny et al., 2021). Tormala and colleagues (2008) relied on this matching idea to show how one could effectively appeal to people who were high rather than low in their attitude certainty. For a typical persuasive message, one reason that people high in certainty are difficult to change is that they are unlikely to process the message arguments. Since they are already certain of their view, they presumably think there is little to learn and thus their minds are closed to the message. Because of this, higher certainty is typically associated with greater resistance to persuasion (e.g., see Mello et al., 2020; Rucker et al., 2014). But, what if the message appeal was matched to people with high certainty? To investigate this, Tormala et al. (2008) first

induced people to feel relatively high or low in their general confidence by generating prior instances in which they felt confidence or doubt (Petty et al., 2002). Then, some participants received a message with strong arguments advocating for a change in university policy. The message was either said to be designed to promote confidence (confidence match condition) or they received no such information (control condition). In the control condition, those made to feel confident were less persuaded by the strong arguments than those who were made to feel doubtful, replicating work showing that enhanced confidence is associated with more resistance. However, when the message had the confidence frame, those in the confidence condition were more influenced than those in the doubt condition, reversing the traditional effect. Thus, just like presenting affective arguments to those with an affectively based attitude can overcome resistance, so too can presenting a message with a confidence frame to those who are feeling confident. In each case, the match could inspire people to process the strong arguments more carefully, engendering persuasion (Petty & Cacioppo, 1990).

Even more recently, the matching technique has been applied to changing attitudes that have a moral rather than a practical basis. As noted earlier, morally-based attitudes are seen as particularly strong and difficult to change (Luttrell, Petty, Briñol, & Wagner, 2016; Skitka et al., 2021). In a series of studies applying the matching notion to this strength variable, Luttrell and colleagues (2019) measured the extent to which participants' attitudes on various topics (recycling, legalizing marijuana) were based on their morals. Then the participants were randomly assigned to receive a message making moral arguments (e.g., recycling releases toxic fumes that are harmful to pets...) or practical ones (e.g., recycling requires an increase in trucks that increase traffic congestion). The practical message became increasingly less effective in influencing attitudes as the moral basis of those attitudes increased, consistent with the typical resistance shown to persuasion as attitudes become stronger. However, the moral message showed the opposite effect, becoming increasingly *more* effective as the moral basis of attitudes increased. In fact, the moral message had an easier time in persuading people with stronger (more moral) than weaker (more practical) attitudes (see also Luttrell & Petty, 2021).

Using Two-Sided Messages

Although the matching technique has had some success in changing strong attitudes, implementation can be cumbersome. That is, changing strong attitudes with matched messages requires knowing the reason *why* the attitude is strong and then developing a message that is tailored to that attitude basis. In a recent series of studies, Xu and Petty (2022, in press) examined a strategy that they

believed would be more generic than the matching approach. In particular, they argued that using a two-sided rather than the more typical one-sided message could be particularly effective for those whose attitudes were strong. One-sided messages only present arguments on the advocated side, but two-sided messages also acknowledge some good points on the opposite side in addition to presenting arguments for the preferred side. Research on one- versus two-sided messages has a long history in social psychology (Hovland et al., 1953) and various moderators of their differential effectiveness have been uncovered (e.g., Rucker et al., 2008; see Crowley & Hoyer, 1994, for a review). Yet, no prior research had examined the relative effectiveness of these different message types for relatively strong versus weak attitudes.

Xu and Petty (2022) reasoned that those who cared deeply about their attitudes (i.e., people with strong attitudes) would be especially appreciative of a message that recognized some validity to their side. Then, in accord with the principle of reciprocity (Cialdini & Goldstein, 2004), they would be more willing to acknowledge some validity to the advocated side. Although everyone would presumably show some appreciation for their side being respected in the persuasive message, the acknowledgement should be especially appreciated by those with strong attitudes. In one study, the moral basis of people's attitudes toward gun control was assessed and then the participants were presented with a persuasive message that advocated against their own view. The message was either entirely one-sided or presented both sides. That is, the two-sided message presented some arguments on the recipient's side in addition to the same arguments as in the one-sided advocacy. To examine the reciprocity hypothesis, the recipient's openness (receptiveness) to the side advocated was assessed (see Hussein & Tormala, 2021; Minson et al., 2020; Ottati & Stern, in press). The results, depicted in Figure 1, showed that for the one-sided message, the typical attitude strength effect occurred – people were more resistant to the message the more morally based their attitudes were. However, for the two-sided message, the opposite occurred – the stronger the attitude was, the more open it was to the other side. In this study Xu and Petty also showed that appreciation for the author mediated this openness effect, and furthermore, the more open to the other side the recipient reported being, the more favorable their attitudes became toward the advocated position. In another study, the interaction between moral basis (attitude strength) and message-sidedness on openness was shown for a message advocating mask wearing during Covid-19 for people who were initially against it.

In this work, Xu and Petty (2022) also demonstrated that to be effective, the two-sided message should mention a *strong* argument on the recipient's side. If

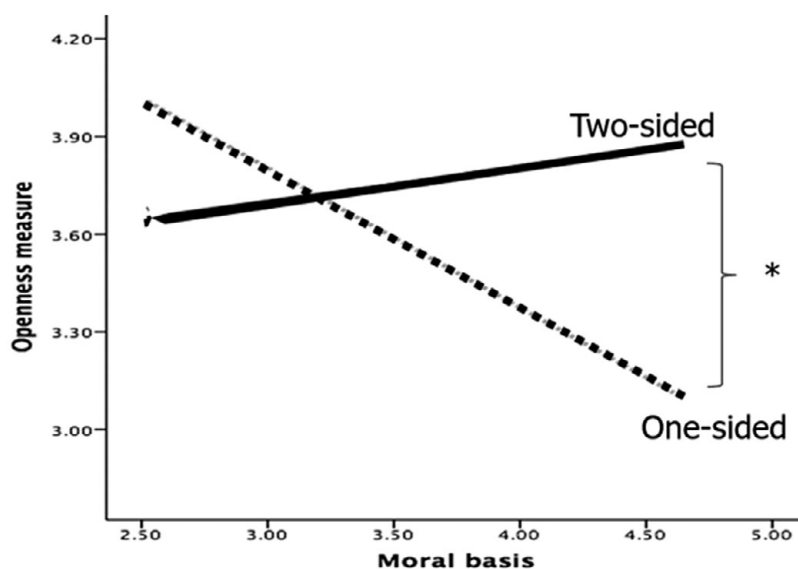


Figure 1. Interaction between the Extent to which Attitudes are Based on Morality and Message-Sidedness on Openness to a Counterattitudinal Message on Capital Punishment

Note. Adapted from Xu and Petty (2022).

a weak argument was instead presented, the two-sided message was no longer any more effective than the one-sided communication (i.e., the two-sided message should respect the participant's view). It is also noteworthy that in a series of subsequent studies, Xu and Petty (in press) showed that the relative effectiveness of a two- over a one-sided message held not only when strength was based in morality, but also when for a non-moral topic (e.g., dental hygiene), strength was indexed by a measure of attitude certainty. The power of a two-sided message to render strong attitudes more open to the other side was even shown in the domain of politics. That is, when attitude strength was indexed with a measure of identity with the participant's political party, the higher the participant's political identity was, the more open the person was to a two-sided message but the less open they were to a one-sided communication. In sum, although it is generally the case that strong attitudes are more resistant to change than weak ones, recent research has demonstrated that there are particular techniques that can be effective in rendering strong attitudes more open to change.

When Weak Attitudes Predict Behavior Better than Strong Ones

In the persuasion work just described, we have seen that particular kinds of messages can become more effective as attitude strength is increased. Thus, although at the time of the 1995 book, it was assumed that persuasion techniques generally do not work as well on stronger attitudes, our new understanding is that some

techniques can actually work better on stronger attitudes. In this final section, we turn to some other situations in which the traditional wisdom regarding strong attitudes has been turned on its head. To illustrate this, we focus on attitude certainty as a variable whose traditional findings can be reversed in certain circumstances. Attitude certainty is an important strength dimension to understand since it is one of the most studied strength variables and over the longest period of time (Tormala & Rucker, 2018). Indeed, even before the concept of attitude strength was widely recognized, researchers pointed to how two people could hold the very same judgment but vary in their judgmental confidence (Johnson, 1945). Most importantly, this early research even showed that measured certainty in attitudes could moderate attitude-behavior consistency, with more certain attitudes predicting behavior better (Sample & Warland, 1973; Warland & Sample, 1973).

Undermining Certainty

The early result that enhanced attitude certainty is related to greater attitude behavior consistency (ABC) has generally held over time (Rucker et al., 2014), but not universally. In particular, there is some reasonable evidence that undermining people's feelings of certainty in their attitudes can sometimes motivate them to engage in certainty restoring actions. For example, in one study Gal and Rucker (2010) had participants write their thoughts on animal testing of products with either their dominant or non-dominant hand. Prior research had shown that writing with the non-dominant hand

undermines confidence in what was written (Briñol & Petty, 2003). Participants were then asked to write what they would say to someone they would like to convert to their own position. Those in the doubt condition (writing with the non-dominant hand) used significantly more words in their advocacy suggesting a greater need to bolster their own view⁴ (see also, Clarkson et al., 2017; Sawicki & Wegener, 2018, for conceptually similar findings). In addition to restoring certainty by strongly advocating for one's attitude, another potentially restoring action is to adopt more extreme beliefs and actions. Adopting extreme attitudes and actions signals to oneself and to others that conviction is high. The desire to remove uncertainty (and restore certainty) should be especially prominent when that uncertainty is threatening in some way. McGregor (2003, 2006) argued that people could compensate for feelings of threatening uncertainty by bolstering their attitudes which can render them more extreme than they were initially (see also Hart, 2014; Heine et al., 2006; Hogg, 2014; Horcajo et al., 2022; McGregor et al., 2001).

Relatively recent work on understanding fanatical behavior (e.g., engaging in aggression for one's cause) has produced conceptually similar results. In particular, Gollwitzer and colleagues (2022) examined what they called *discordant knowing*, a situation in which people feel certain of something but then learn that their position is opposed by other people. Learning that others disagree with you, especially liked or important others, can presumably shake one's confidence and produce feelings of conflict regarding the attitude (i.e., subjective ambivalence, Priester & Petty, 2001).⁵ In a series of studies, Gollwitzer et al. found that discordant knowing was associated with a willingness to join extreme groups and vote for more extreme candidates.⁶ Furthermore, this effect was mediated by feelings of threat associated with the disagreement from

others. That is, when people had their highly certain attitudes challenged by learning that others disagreed with them, this produced a feeling of threat which resulted in higher support for extreme candidates and actions. In one study, participants who were certain about their moral views on abortion exhibited greater fanaticism in response to an article that challenged that view by indicating that most others opposed it. In other studies, the same fanaticism was not increased when people learned that others agreed with their views, even though this information enhanced their certainty. Thus, challenging, attacking, or attempting to undermine an attitude held with certainty seems to be the key (see also Oettingen et al., 2022).

Uncertainty and Fanatical Behavior in Threatening Domains

The link between attempts to undermine confidence and the attraction to fanatical (extreme) groups led us to hypothesize that perhaps people simply walking around with uncertainty in their important attitudes would be similarly attracted to extreme actions especially if the attitude domain was perceived as threatening. It would be highly disconcerting to be unsure of one's attitude in a domain where threat was perceived. More specifically, we (Siev, Petty, & Briñol, 2022) hypothesized that although attitude certainty would be positively related to the willingness to engage in moderate or normal behavior (e.g., voting for one's preferred candidate), it could be negatively related to willingness to engage in more extreme (fanatical) behavior (e.g., fighting and dying for one's beliefs), especially if a threat was perceived. To examine this, we (Siev et al., 2023) combined the data from 6 online studies conducted with Mechanical Turk and student samples we had conducted on the topic of Covid-19 in which we measured people's attitudes, attitude certainty, and their willingness to engage in 20 attitude-consistent behaviors (up to $N = 1,496$ for the behavior with the most observations). We also assessed the perceived threat associated with Covid-19. The particular behaviors assessed ranged from wearing a mask to sacrificing one's life for one's beliefs. These behaviors were subsequently rated for their extremity by a separate group of participants (1 = not at all extreme, 7 = very extreme; $N = 69-72$ depending on the behavior), and these normative ratings were used to predict the effects of attitude certainty on the behavioral willingness measures.

We conducted a multi-level model with attitude certainty and behavioral extremity (within-subjects) predicting behavioral willingness, where willingness ratings were nested within study, which was nested within type of behavior. This produced a significant certainty \times extremity interaction, $b = -.18$, $t(14.11) =$

⁴Those who were induced to affirm their identities before the writing task did not show this effect because the affirmation presumably preempted the discomfort associated with the uncertainty.

⁵In one study Gollwitzer et al. used a common ambivalence formula (Thompson et al., 1995) to index discordant knowing (using measures of certainty in one's own position and perceived social opposition to replace the positive and negative reactions in the original formula. Although this research looked at a particular kind of ambivalence (discrepancy between one's attitude certainty and perceptions of others), it is reasonable to propose that a more typical ambivalence index composed of one's personal positive and negative reactions (Priester & Petty, 1996) could also contribute to fanaticism.

⁶Similar effects were proposed for a related phenomenon called *paradoxical knowing* in which people recognize that their high certainty could be unfounded (e.g., it is based on something that is unknowable; see Gollwitzer & Oettingen, 2019). As with discordant knowing, this situation would likely render people uncomfortable with their attitudes. We suggest that other forms of internal attitudinal conflict (e.g., between one's current and desired attitudes, DeMarree et al., 2014) could also contribute to fanaticism.

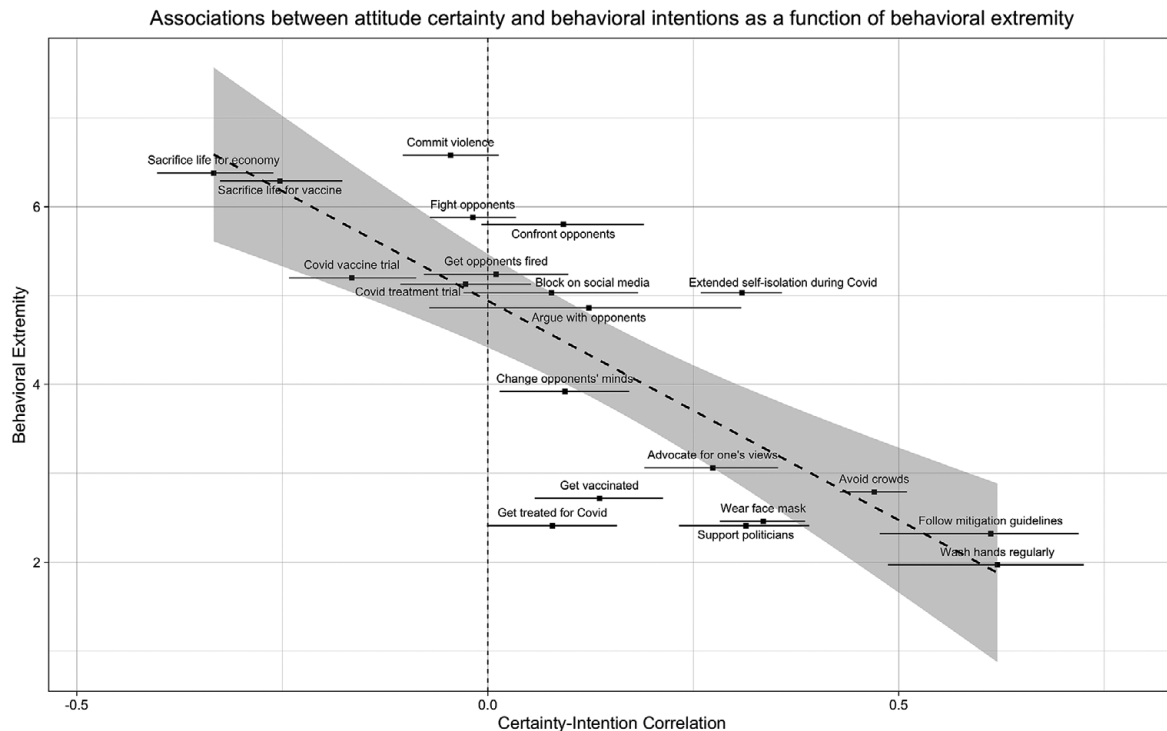


Figure 2. The Effect of Attitude Certainty on Self-Reported Willingness to Engage in Attitude-Consistent Behaviors Was Strongly Positive for the Least Extreme Behaviors but Became Less Positive and Ultimately Significantly Negative as the Behaviors Considered Became More Extreme
Note. Data from Siev et al. (2023).

−5.39, $p < .0001$, 95% CI [−.25, −.11], that is depicted in Figure 2. As expected, attitude certainty positively predicted willingness to engage in moderate behaviors (−1 SD in rated extremity), $b = .32$, $t(14.70) = 4.23$, $p < .001$, 95% CI [.16, .47] but this reversed for extreme behaviors (+1 SD extremity: $b = -.23$, $t(15.42) = -3.40$, $p = .004$), 95% CI [−.38, −.09]. Furthermore, analyses including the threat associated with the issues showed that it further moderated the results such that the negative relationship between certainty and intentions to engage in the extreme behaviors was especially prominent when perceived threat was high (Siev et al., 2023).

In sum, the accumulated evidence appears to suggest that when people's attitudes on a variety of important issues become problematic (uncomfortable) in some way (e.g., because their high certainty is challenged, Gollwitzer et al., 2022, or they are uncertain of their views in a threatening domain, Siev et al., 2022, 2023), they can react by becoming more willing to engage in extreme and even violent behaviors in an attempt to compensate for that weakness by demonstrating strength.

Conclusions

In this brief review, we have focused on updating a few of the traditional perspectives on attitude strength that

have been prominent in the literature. First, we noted that in contrast to the previous view that there were different types of attitude strength constructs with some (e.g., accessibility) being operative and others (e.g., certainty) being meta-cognitive, it might be preferable to think of there being a variety of individual attitude strength dimensions, each of which can be measured with structural (objective) and meta-cognitive (subjective) assessments. Critically, this updated view holds that the different measures of the same attitude strength attribute can sometimes predict different outcomes, and can also predict unique variance in the same outcome, or predict the same outcome but under different circumstances because of different operating mechanisms. Second, we noted that although it is generally true that the various attitude strength indicators are predictive of an attitude being more difficult to change, there are some recently identified techniques that can actually be more effective in changing stronger than weaker attitudes. These techniques include matching the persuasive message to the basis of the attitude's strength and using two- rather than one-sided messages.

Finally, we noted that although indicators of attitude strength are often positively associated with normal or mundane behaviors (e.g., voting, purchasing a consumer product), there are situations in which weaker

attitudes are threatening to people (e.g., because the attitude domain is associated with threat and clarity is desired). In these situations, uncertainty can motivate extreme reactions. Lacking certainty can generally be unpleasant and disconcerting, but especially if the issue poses some perceived threat (Sawicki & Wegener, 2018). This can lead to efforts to compensate for that weakness, such as engaging in extreme action. In essence, in this situation, a strength variable (i.e., certainty) appears to be producing an effect opposite to its traditional strength role. However, it is important to note that this phenomenon is not the only one in which a strength variable has been associated with an effect opposite to its traditional one. In particular, several studies, noted briefly next, have shown that certainty has its traditional strength effect when attitudinal ambivalence is low, but it can have a reversed effect if the attitude is also ambivalent.

One way to think about this reversed effect for certainty when attitudes are ambivalent is that higher certainty (associated with strength) can magnify the impact of ambivalence (associated with weakness; Petty et al., 2007). This means that strength is having its traditional magnification role, but in this instance is magnifying the impact of ambivalence. Thus, with an ambivalent attitude, higher certainty produces more weakness rather than more strength, as people now feel certain of their attitude's weakness. In the first study demonstrating this interesting outcome, Clarkson et al. (2008) found that manipulating certainty to be high increased resistance to persuasion when attitudes were low in ambivalence (the traditional finding), but when attitudes were ambivalent, enhancing certainty rendered attitudes more susceptible to persuasion (see Luttrell, Petty, & Briñol, 2016, 2020, for similar findings with respect to attitude persistence over time). A reversal of the link between higher attitude certainty producing greater attitude-behavior consistency was also demonstrated when ambivalence was high (Clarkson et al., 2008; see Durso et al., 2016, for conceptually similar results, and Wallace et al., 2020, for similar interactions between ambivalence and perceived knowledge).

In situations where certainty (or other strength variables) reverse their traditional effects, it is important to determine what moderates this different impact. In these reversal situations, rather than concluding that a variable that is considered a strength indicator has suddenly become an index of weakness, we suspect it will be better to continue to consider the variable (e.g., certainty) as a strength indicator and then view the reverse effect as occurring either because that strength from certainty is magnifying weakness (e.g., in the case of ambivalence; see also DeMarree et al., 2015; Wichman et al., 2010) or because that strength itself is being

challenged in some way. When strength is challenged or when strength is especially desired (e.g., when under threat), people can react to maintain, demonstrate, or enhance that strength. Thus, in some cases where people hold weak attitudes, this weakness is troublesome, leading people to aim to restore strength.

At the time of the 1995 *Attitude Strength* book, it was unclear how influential the construct of attitude strength would remain over time. It appears that much progress has been made in the intervening years in understanding how to measure strength, how to impact strong attitudes, and in understanding the mechanisms by which strength either determines behavior directly or in compensation for weakness. Perhaps most importantly, the concept of attitude strength has been applied to some of the most important societal questions of our time, such as understanding the determinants of fanaticism and support for violence.

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