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Abstract

Past research suggests that cognitive and affective attitudes are more open to change toward cognitive and affective (i.e., matched) persuasive attacks, respectively. The present research investigates how attitude certainty influences this openness. Although an extensive literature suggests that certainty generally reduces an attitude's openness to change, the authors explore the possibility that certainty might increase an attitude's openness to change in the context of affective or cognitive appeals. Based on the recently proposed *amplification hypothesis*, the authors posit that high (vs. low) attitude certainty will boost the resistance of attitudes to mismatched attacks (e.g., affective attitudes attacked by cognitive messages) but boost the openness of attitudes to matched attacks (e.g., affective attitudes attacked by affective messages). Two experiments provide support for this hypothesis. Implications for increasing the openness of attitudes to both matched and mismatched attacks are discussed.

Keywords

attitudes, persuasion, affect, cognition, certainty, matching effects

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People's attitudes toward objects and issues differ along numerous structural dimensions (see Fabrigar, MacDonald, & Wegener, 2005, for a review). One well-studied dimension is the attitude's underlying informational basis—in particular, whether the attitude has a primarily cognitive or affective orientation (e.g., Abelson, Kinder, Peters, & Fiske, 1982; Crites, Fabrigar, & Petty, 1994; see Petty, Wheeler, & Bizer, 2000). For instance, when considering an automobile purchase, one might favor a new Porsche because it feels exciting to drive (affective orientation) or prefer a Toyota Prius because it is highly fuel efficient (cognitive orientation). This distinction between attitudes' cognitive and affective orientations has provided crucial insight into a variety of important attitude-relevant questions, such as what makes attitudes accessible (e.g., Giner-Sorolla, 2004), when do attitudes guide behavior (e.g., Esses & Dovidio, 2002; Verplancken & Herabadi, 2001), and—most germane to the present research—when do attitudes resist or yield to persuasion.

Cognitive and Affective Matching Effects in Persuasion

Past research exploring the role of cognitive versus affective orientations in persuasion has revealed that attitudes exposed to counterattitudinal messages that *match* their orientation

(e.g., an affective attitude attacked by an affective message) often show greater change in the direction of the counterattitudinal position than attitudes exposed to counterattitudinal messages that mismatch their orientation (e.g., a cognitive attitude attacked by an affective message). This advantage of matched compared to mismatched attacks is now well documented (e.g., Drolet & Aaker, 2002; Edwards, 1990; Edwards & von Hippel, 1995; Fabrigar & Petty, 1999; Haddock, Maio, Arnold, & Huskinson, 2008; Huskinson & Haddock, 2004; Mayer & Tormala, 2010; Ivanov, Pfau, & Parker, 2009; see Millar & Millar, 1990, for an exception).

Fabrigar and Petty (1999), for instance, provided participants with initially positive information about a fictitious animal—the lempur. This information was presented in a passage describing the animal using either emotive, affect-laden language to induce affective attitudes or rational, cognitive

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language to induce cognitive attitudes. They then presented those same participants with a persuasive message (i.e., negative information about the animal) that was either affective or cognitive in tone. Results indicated greater persuasion when messages matched rather than mismatched the orientation of the target attitude. For instance, people with affective attitudes changed more toward the affective (matched) message than toward the cognitive (mismatched) message. Thus, matching the affective versus cognitive content of a persuasive message to the affective versus cognitive orientation of the target attitude can increase that attitude's openness to change.

An extensive literature now attests to the numerous ways attitudes, people, and messages can vary to give them a more affective or cognitive orientation and, thus, facilitate matching effects in persuasion (e.g., Haddock et al., 2008; Mayer & Tormala, 2010; See, Petty, & Fabrigar, 2008). Interestingly, though, far less attention has been devoted to understanding the factors that might accentuate or attenuate these effects. For example, when a given attitude and message are both affective in nature, what turns the matching effect on and off? In the current research, we explore a metacognitive influence on these effects by examining the potential impact of attitude certainty. In contrast to the traditional view of attitude certainty as a crystallizing agent that makes attitudes generally resistant to change, we propose that heightened certainty might actually increase the openness of affective and cognitive attitudes to matched persuasive attacks.

Attitude Certainty

Although an attitude refers to one's global evaluation of an object—for example, the extent to which one likes a person, supports a policy, or favors a brand—*attitude certainty* refers to one's subjective sense of confidence, conviction, clarity, or correctness about that evaluation (Abelson, 1988; Gross, Holtz, & Miller, 1995; Petrocelli, Tormala, & Rucker, 2007). Attitude certainty has been the focus of extensive research in the past few decades, primarily because attitudes held with certainty (compared to uncertainty) characteristically demonstrate greater resistance to persuasion (Babad, Ariav, Rosen, & Salomon, 1987; Bassili, 1996; Tormala & Petty, 2002), greater stability or persistence over time (Abelson, 1988; Bassili, 1996), and greater influence over behavior and choice (Bizer, Tormala, Rucker, & Petty, 2006; Fazio & Zanna, 1978; Glasman & Albaracín, 2006; Rucker & Petty, 2004; Tormala, Clarkson, & Petty, 2006).

Based on these findings, the prevailing view of attitude certainty is that certainty functions as a crystallizing agent. That is, when people become more certain of their attitudes, those attitudes are thought to become more influential and more resistant to change. For instance, if two individuals hold equally favorable attitudes toward financial reform but differ in attitude certainty, the crystallization perspective

suggests that the attitude held with greater certainty will be more resistant to change. Such crystallization could occur because certainty signals that an attitude is based on valid information, which makes that information harder to overcome. This perspective, which we term the *crystallization hypothesis*, is well supported in the literature (see Tormala & Rucker, 2007).

In contrast to the traditional conceptualization, an alternative perspective has emerged in the form of the *amplification hypothesis* (Clarkson, Tormala, & Rucker, 2008). This view suggests that the impact of attitude certainty on an attitude's openness versus resistance to change is malleable. That is, becoming more certain of an attitude can open or close that attitude to change. The central tenet of the amplification hypothesis is that, based on their underlying structural characteristics, different attitudes have different dominant responses. An attitude's dominant response is defined as its characteristic tendency in a given situation; in the context of persuasion, an important dominant response is whether the attitude is generally resistant or open to change.

To give an example of what we mean by dominant response, past research has shown that attitudes with different structural features characteristically demonstrate differential openness to change. For instance, ambivalent attitudes generally show greater openness to change than do univalent attitudes (e.g., Armitage & Conner, 2000; Glasman & Albaracín, 2006; Visser & Mirabile, 2004), moderate attitudes are typically easier to change than extreme attitudes (Tesser, Martin, & Mendolia, 1995), and low accessibility attitudes are generally less resistant to change than high accessibility attitudes (Fazio, 1995). Thus, the dominant (or characteristic) response of ambivalent, moderate, or inaccessible attitudes is to be relatively more open to change than their univalent, extreme, or accessible counterparts.¹

Most relevant to the present research, the amplification hypothesis posits that certainty amplifies these dominant responses, increasing an attitude's characteristic resistance or openness depending on its underlying structure. In an initial test of this possibility, Clarkson et al. (2008) reported three experiments in which they independently manipulated participants' attitude ambivalence (vs. univalence) and attitude certainty (vs. uncertainty) prior to exposing them to a persuasive message. Consistent with the amplification view, results indicated that heightened certainty increased the resistance of univalent attitudes (i.e., made them less open to change) but decreased the resistance of ambivalent attitudes (i.e., made them more open to change). This latter effect was especially noteworthy as it contradicted the traditional crystallization view of attitude certainty suggesting that certainty invariably promotes resistance. Instead, certainty induced more resistance or *openness* to change, depending on the characteristic tendency of the (univalent or ambivalent) attitude. Again, ambivalent attitudes tend to be more open to change than univalent attitudes, and certainty amplified this effect.

The Present Research

Clarkson et al. (2008) provided initial evidence for the notion that the consequences of attitude certainty are not as straightforward as originally believed. Most notable, attitudes known to be relatively open to change (i.e., ambivalent attitudes) became even more open following a certainty induction. Thus, heightening attitude certainty can promote attitude change when the attitude's structural features promote openness. In the current research, we apply this logic to the domain of affective and cognitive matching effects in persuasion. In contrast to a traditional crystallization view, which suggests that increased certainty makes any attitude more resistant to attack, the amplification perspective suggests that attitude certainty might amplify affective and cognitive attitudes' openness to affective and cognitive attacks, respectively.

As reviewed, the common tendency of both affective and cognitive attitudes is to be somewhat open to matched persuasive messages but more resistant to mismatched messages. We predict that heightened certainty will amplify this effect. That is, both affective and cognitive attitudes will be more open to matched messages when those attitudes are held with high rather than low certainty. Conversely, both affective and cognitive attitudes will be more resistant to mismatched messages when held with high rather than low certainty. Viewed differently, we postulate that increased attitude certainty will amplify affective and cognitive attitudes' responses to affective and cognitive attacks. Investigating this possibility is the primary aim of the current research.

Experiment I

In Experiment 1, we induced initial affective or cognitive attitudes toward a fictitious issue (mineral donation), manipulated attitude certainty, and then presented participants with a counterattitudinal message that was either affective or cognitive in tone. We hypothesized that high (vs. low) certainty attitudes would be more resistant to change when exposed to the mismatched message yet more *open* to change when exposed to the matched message. This result would suggest that certainty can promote resistance or openness to counterattitudinal change by amplifying matching and mismatching effects in persuasion.

Method

Participants. Participating in partial fulfillment of a course requirement, 125 undergraduates were randomly assigned to conditions in a 2 (attitude orientation: affective or cognitive) \times 2 (attitude consensus: high or low) \times 2 (attack: affective or cognitive) between-participants factorial design.

Procedure. Participants were welcomed to the lab by a research assistant and seated at individual computers where

all the materials were presented. On the initial screen, participants were told that the purpose of the study was to understand how different types of communication (e.g., first person vs. third person) affect people's perceptions. They were also told that all of the communications in our database related to the topic of mineral donation, defined as the donation of minerals from one's blood to others in need. They then received "background information" about mineral donation in the form of a "recent AP news report." This report outlined the importance of blood minerals to mental and physical well-being and briefly described the ostensibly controversial medical procedure to remove them. We used a fictitious issue to control for participants' prior knowledge, as it was critical to induce attitudes that were initially affectively or cognitively oriented. Pretesting indicated that participants were unfamiliar with this topic.

Following this information, participants were informed that they had been assigned to the first-person condition and that they would be presented with "firsthand accounts of people's experiences with this controversial new procedure." These firsthand accounts served as our initial message and were either affective or cognitive in tone (see attitude orientation manipulation). Of importance, though, the initial affective and cognitive messages were designed to induce equally *negative* attitudes toward mineral donation.

After reading the initial negative message, participants reported their attitudes toward mineral donation. They were then informed that our research had resulted in a database of nearly 2,000 respondents from 14 different states and that we found that participants often are curious to know about the attitudes of other respondents. We then informed them that we would provide them with a brief "attitude analysis" in which their attitude would be compared to the attitudes in our database. This information set the stage for our certainty manipulation (see attitude consensus manipulation). Following the certainty manipulation, participants reported their attitude certainty and completed an assessment of the affect-cognitive orientation of their attitudes before responding to several items concerning the readability of the initial message to substantiate the cover story.

Finally, participants were presented with another first-person account of mineral donation. This second message served as our counterattitudinal attack and consisted entirely of positive information about mineral donation that was either affective or cognitive in tone (see attack manipulation). After reading this second message, participants again reported their attitudes toward mineral donation as well as their behavioral intentions.²

Independent Variables

Attitude orientation. The initial message presented all participants with negative information about mineral donation, but the content of this negative message was manipulated to

be either affective or cognitive. In the *affective orientation condition*, participants read a negative account of mineral donation described in very affective language. For instance,

When the nurse was finally ready, I clamped my eyes shut as she swabbed iodine on the inside crook of my elbow. I couldn't stand it, the waiting for the sharp prick of the needle. So I peeked, and the first thing I saw was this large, fat needle. Chills literally ran through my body. . . . I felt a razor sting, and then a powerful ache as though someone had punched my arm. . . . I turned my head, then immediately felt a wave of dizziness and nausea as I saw blood pouring into a clear plastic bag.

In the *cognitive orientation condition*, participants read a negative account of mineral donation described in very cognitive language. For instance,

Even more disturbing was a debate on the controversial procedure published online between two researchers (both at top universities). The debate was clearly won by the researcher against the benefits of mineral donation. He cited numerous studies that showed no difference between minerals taken from human blood and minerals from other sources. Beyond questioning the value of placing humans at an unnecessary risk—given that the procedure of mineral donation takes over two hours and involves a significant loss of blood—he also noted that the questionable connections to private industry that has led to donations being “lost,” “misplaced,” or simply “unaccounted for.”

Attitude consensus. After reporting their initial attitudes, participants were randomly assigned to receive either low or high (false) consensus feedback. In particular, participants were informed that the computer would calculate how closely their attitude aligned with those of the nearly 2,000 respondents in our database. Following a brief delay, participants were told that either 12.93% (low consensus) or 87.07% (high consensus) of prior participants shared their attitude toward mineral donation and that therefore most respondents either disagree or agree with them, respectively. This manipulation has been used extensively in prior research to vary attitude certainty (e.g., Petrocelli et al., 2007; Tormala, DeSensi, Clarkson, & Rucker, 2009; Visser & Mirabile, 2004).

Attack. The second message was designed to present all participants with positive information to counter the initial negative message about mineral donation. Similar to the attitude orientation manipulation, the tone of this message was manipulated to be either affective or cognitive. In the *affective attack condition*, participants read a positive account of mineral donation taking an affective tone. For instance,

They recommended I bring something to read for the procedure—and I had brought a magazine—but they didn't tell me I would have access to my own television which included cable as well as an on-demand library of hundreds of movies. That was my favorite perk. They were paying me to relax in a comfortable lounger and watch movies!

In the *cognitive attack condition*, participants read a positive account of mineral donation taking a cognitive, rational tone. For instance,

Doctors from nearby hospitals and universities were collaborating at the center [my friends] each visited to donate [minerals], and many of these doctors were volunteering their time from their private-practices or academic responsibilities to work with these minerals in an effort to find cures for many different diseases, including some forms of cancer. One doctor shared with my friend about how his sample of blood would be used in nearly 50 different experiments, all of which could help develop cures for disease.

Dependent Measures

Time 1 attitudes. Following the initial message, participants reported their global attitude by rating mineral donations on a single semantic differential scale ranging from 1 (*bad*) to 9 (*good*).

Attitude certainty. Certainty was assessed after the consensus manipulation using the following item (adapted from Clarkson et al., 2008; Fazio & Zanna, 1978): “How certain do you feel about your attitude toward mineral donation?” Responses were provided on a scale ranging from 1 (*not certain at all*) to 9 (*extremely certain*).

Attitude orientation. Immediately after the attitude certainty assessment and before the counterattack, participants were asked to rate the extent to which they associated mineral donation with a series of different adjectives. Half of the adjectives were affective in tone (e.g., disgusted); the other half were cognitive in tone (e.g., unnecessary). These items were adopted from past research (Crites et al., 1994), and responses were indicated on scales ranging from 1 (*not at all*) to 9 (*very much*). Separate affective ($\alpha = .79$) and cognitive ($\alpha = .86$) scores were computed by averaging across responses to the affective and cognitive adjectives, respectively. An attitude-orientation index was then created for all participants by subtracting their mean score on the cognitive scale from their mean score on the affective scale. Values above 0 indicated a greater affective (vs. cognitive) attitude orientation, whereas values below 0 indicated a greater cognitive (vs. affective) attitude orientation. This procedure was adapted from past research exploring differences in affective and cognitive attitudes (e.g., Fabrigar & Petty, 1999; Mayer & Tormala, 2010).

Table 1. Time 1 Attitudes, Time 2 Attitudes, and Attitude Change as a Function of Attitude Orientation, Attitude Consensus, and Counterattack for Experiments 1 and 2

Dependent measure	Affective orientation								Cognitive orientation								
	Affective attack				Cognitive attack				Affective attack				Cognitive attack				
	High consensus		Low consensus		High consensus		Low consensus		High consensus		Low consensus		High consensus		Low consensus		
M	SD	M	SD	M	SD	M	SD	M	SD	M	SD	M	SD	M	SD	M	SD
Time 1 attitudes	Exp 1	3.70	1.15	3.42	1.56	4.00	1.41	4.70	1.70	3.24	1.62	3.50	1.67	3.08	1.75	3.37	1.38
	Exp 2	3.33	2.58	4.40	1.65	4.31	2.14	4.38	1.41	3.69	1.49	4.13	1.75	5.42	1.56	5.28	1.75
Time 2 attitudes	Exp 1	6.22	1.24	3.83	1.90	3.88	1.36	6.70	2.06	3.80	1.66	5.40	1.85	4.92	1.98	4.00	1.41
	Exp 2	4.50	2.88	4.50	1.51	4.69	2.18	5.75	1.58	3.62	1.76	5.13	1.63	6.63	1.38	5.40	1.92
Attitude change	Exp 1	2.52	1.50	0.42	1.88	-0.13	1.36	2.00	1.83	0.56	1.26	1.95	2.01	1.85	1.72	0.63	1.01
	Exp 2	1.17	0.75	0.10	1.20	0.38	0.51	1.38	0.92	-0.08	0.64	1.00	1.55	1.21	1.41	0.12	1.64

Attitude change. Following the second message about mineral donation (i.e., the attack), participants again reported their global attitudes on the same item as at Time 1. An attitude change index was created by subtracting participants' Time 1 attitudes from their Time 2 attitudes. Thus, higher values indicated greater attitude change—that is, more persuasion in response to the second (positive) message.

Behavioral intentions. Finally, in addition to the attitude measures, we also included a behavioral intention item that followed Time 2 attitudes. Specifically, we asked participants to rate how willing they would be to donate minerals in the future, using a scale ranging from 1 (*not at all*) to 9 (*extremely*).

Results

Time 1 attitudes. Because initial attitudes were assessed before the attack had been received, the Time 1 attitude data were submitted to a two-way ANOVA, with attitude orientation and attitude consensus as the independent variables. No effects were significant ($ps > .09$), suggesting that attitudes toward mineral donation were equivalent at the outset of the experiment (see Table 1 for means). Furthermore, the grand mean ($M = 3.58$, $SD = 1.51$) was significantly lower than the midpoint of the attitude scale (5), $t(124) = -10.55$, $p < .001$, indicating that the initial message successfully induced negative attitudes.

Attitude orientation. The attitude orientation index was submitted to the same analysis. As expected, there was a significant effect of attitude orientation, $F(1, 121) = 67.08$, $p < .001$, $\eta^2_p = .34$; participants who received the initial affective message had more affective than cognitive associations ($M = 0.17$, $SD = 1.01$), whereas participants who received the initial cognitive message had more cognitive than affective associations ($M = -1.97$, $SD = 1.80$). No other effects were significant (all $ps > .09$).³

Attitude certainty. Finally, we submitted the attitude certainty data to the same analysis, which revealed a main effect of consensus, $F(1, 121) = 3.75$, $p = .05$, $\eta^2_p = .04$. As expected, participants who received high consensus feedback ($M = 5.95$, $SD = 2.47$) reported greater attitude certainty than did participants who received low consensus feedback ($M = 5.21$, $SD = 2.30$). No other effects were significant (all $ps > .09$).

Attitude change. The attitude change index was submitted to a three-way ANOVA with attitude orientation, attitude consensus, and attack as independent variables. The analysis revealed a significant three-way interaction, $F(1, 117) = 32.72$, $p < .001$, $\eta^2_p = .21$ (see Figure 1).⁴ No other effects were significant (all $ps > .15$). Most important, the three-way interaction involved two opposing two-way interactions (see Table 1 for means). For individuals with initially *affective* attitudes, there were no main effects for consensus or attack ($Fs < 1$), but there was a significant interaction between these variables, $F(1, 117) = 12.53$, $p = .001$, $\eta^2_p = .15$. Participants exposed to the affective (matched) attack evinced greater attitude change after receiving high rather than low consensus feedback, $F(1, 117) = 8.71$, $p = .001$, $\eta^2_p = .11$. In contrast, participants exposed to the cognitive (mismatched) attack evinced greater attitude change after receiving low rather than high consensus feedback, $F(1, 117) = 4.62$, $p = .03$, $\eta^2_p = .06$. For individuals with initially *cognitive* attitudes, again there were no main effects ($Fs < 1$), but there was a significant consensus × attack interaction, $F(1, 117) = 20.63$, $p < .001$, $\eta^2_p = .28$. In this case, participants exposed to the cognitive (matched) attack evinced greater attitude change after receiving high rather than low consensus feedback, $F(1, 117) = 14.18$, $p < .001$, $\eta^2_p = .21$. In contrast, participants exposed to the affective (mismatched) attack evinced greater attitude change after receiving low rather than high consensus feedback, $F(1, 117) = 8.14$, $p < .01$, $\eta^2_p = .13$. Thus, for both affective and cognitive attitudes, high (vs. low)

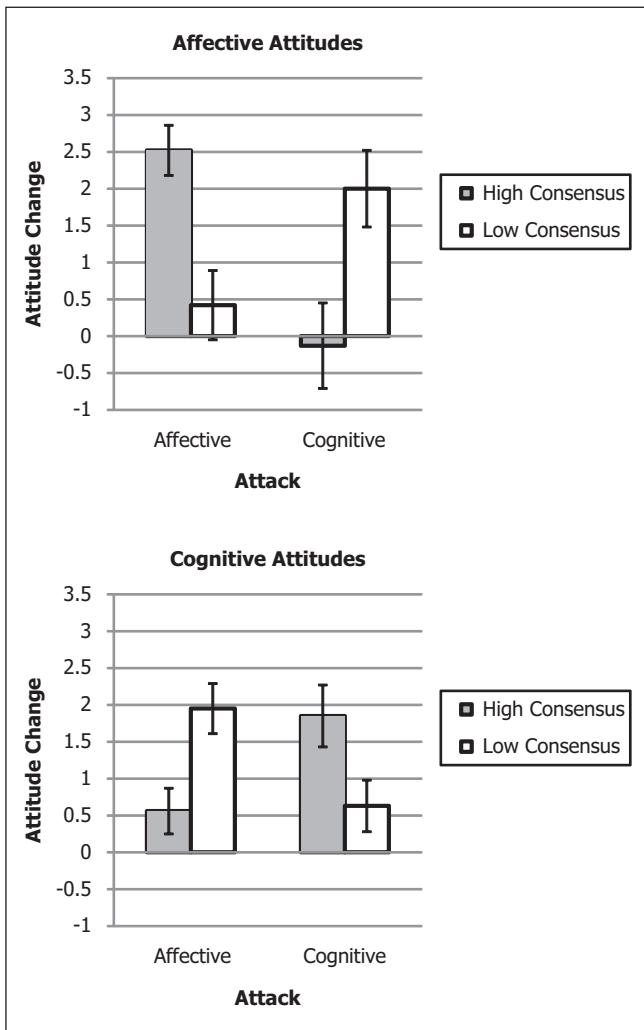


Figure 1. Attitude change as a function of consensus and attack condition for affective (top panel) and cognitive (bottom panel) attitudes in Experiment 1

certainty produced greater change toward the matched attack yet greater resistance to the mismatched attack.

Behavioral intentions. The behavioral intention data were submitted to the same analysis, which revealed a significant three-way interaction in the same pattern as the attitude change data, $F(1, 117) = 22.90, p < .001, \eta^2_p = .16$. No other effects were significant (all $Fs < 1$). As with the attitude change data, we deconstructed this interaction according to attitude orientation. For individuals with initially *affective* attitudes, neither main effect was significant ($Fs < 1$), but we did find a significant consensus \times attack interaction, $F(1, 117) = 11.68, p < .001, \eta^2_p = .14$. Participants exposed to the affective (matched) attack showed greater willingness to donate after receiving high ($M = 4.00, SD = 2.66$) rather than low ($M = 2.52, SD = 1.96$) consensus feedback, $F(1, 117) = 5.32, p = .02, \eta^2_p = .07$. In contrast, participants exposed to the cognitive (mismatched) attack showed greater willingness to donate after receiving low ($M = 4.15, SD = 2.27$

rather than high ($M = 2.21, SD = 1.27$) consensus feedback, $F(1, 117) = 6.38, p = .01, \eta^2_p = .08$. For individuals with initially *cognitive* attitudes, this pattern was reversed. Again, neither main effect was significant ($Fs < 1$) but there was a significant interaction, $F(1, 117) = 11.55, p < .001, \eta^2_p = .18$. Here, participants exposed to the cognitive (matched) attack showed greater willingness to donate after receiving high ($M = 4.20, SD = 2.53$) rather than low ($M = 2.13, SD = 1.25$) consensus feedback, $F(1, 117) = 4.19, p = .04, \eta^2_p = .07$. In contrast, participants exposed to the affective (mismatched) attack showed greater willingness to donate after receiving low ($M = 4.65, SD = 2.48$) rather than high ($M = 2.42, SD = 1.83$) consensus feedback, $F(1, 117) = 8.62, p = .001, \eta^2_p = .14$.

Discussion

The primary goal of Experiment 1 was to assess the effect of attitude certainty on the openness of cognitive and affective attitudes to matched versus mismatched attacks. Rather than crystallizing attitudes and instilling resistance to any attack, building attitude certainty appeared to increase the openness of both cognitive and affective attitudes to matched as opposed to mismatched attacks. Moreover, this pattern carried through to behavioral intentions; high certainty individuals were more willing to donate in the future when exposed to the matched rather than mismatched attack. Taken together, these results provide strong support for an amplification perspective on the role of attitude certainty in moderating cognitive and affective matching effects in persuasion.

Although our attention has focused primarily on what high attitude certainty does, the attitude change results among low certainty individuals are noteworthy as well. Recall that both the matched and the mismatched messages were counterattitudinal, yet low certainty individuals changed more than high certainty individuals only when they received the mismatched messages. In other words, low (vs. high) certainty individuals showed greater resistance to the matched attack but greater openness to the mismatched attack. Thus, just as high attitude certainty appears to augment the persuasive advantage of matched (compared to mismatched) messages, low attitude certainty appears to augment the persuasive advantage of mismatched (compared to matched) messages. This result is consistent with the amplification perspective that certainty (uncertainty) accentuates (undermines) the typical effect in this paradigm.

Experiment 2

In Experiment 2, we sought to provide stronger evidence that the current effects stem from cognitive and affective matching rather than some other form of matching. Pilot studies for Experiment 1 suggested that the messages we used were similar on a number of dimensions (see Note 2), but there are a host of variables that theoretically could be confounded with affective and cognitive message content. For example,

although our pilot study suggested that neither message seemed more or less impersonal than the other, the affective messages might have seemed more anecdotal and less statistical than the cognitive messages. Of course, such variations could be the very factors that make a message seem more affective or cognitive in nature. Moreover, even if the messages in Experiment 1 varied aspects of participants' attitudes other than affective or cognitive orientation, our findings would still suggest certainty can amplify matching effects and, thus, open attitudes to counterattitudinal attacks.

Nevertheless, our interest in the present article is in affective versus cognitive matching. To increase confidence that the effects in Experiment 1 stemmed from affective-cognitive matching, we modified our paradigm to manipulate the mere perception of affective or cognitive content in our messages. To do so, we held the actual information presented at Time 1 and at Time 2 constant but varied whether participants were primed to focus on their affective or cognitive reactions to the message (Time 1) and whether the message was framed in terms of affect or cognition (Time 2). Specifically, at Time 2 we varied whether the arguments were introduced with the words *I think* or *I feel*, which recent research suggests can activate a cognitive or affective orientation, respectively, and help induce matching effects in persuasion (Mayer & Tormala, 2010). Thus, we were able to control for message content while systematically varying the affective or cognitive lens through which people viewed the messages. Despite these modifications, we anticipated a similar attitude change pattern as in Experiment 1. That is, high (compared to low) certainty attitudes were expected to be more resistant to change in the mismatched condition yet more open to change in the matched condition.

Method

Participants. Participating in partial fulfillment of a course requirement, 115 undergraduates were randomly assigned to conditions in a 2 (orientation prime: affective or cognitive) \times 2 (attitude consensus: high or low) \times 2 (message frame: feel or think) between-participants factorial design.

Procedure. As in Experiment 1, participants were informed that the purpose of the study was to understand how different types of communication affect people's perceptions and that they would receive information about the issue of mineral donation. Also like Experiment 1, this information took the form of a "recent AP news report" and was negative in valence. Unlike Experiment 1, however, this information was pretested to be equivalent with respect to its affective or cognitive content, and all participants received the exact same message. For instance, all participants read,

Mineral donation is controversial for a variety of reasons. Bruising and muscle swelling in the area where the minerals are extracted have been reported by donors

for up to two weeks after the donation. Additionally, the majority of donation centers are privately-funded, which has led to a lack of regulation.

Importantly, prior to reading this information, participants were instructed to focus on their emotional or cognitive response to the message (see orientation prime manipulation).

After reading the initial message, participants indicated their attitudes toward mineral donation before being informed that we would be comparing their attitude to the attitudes of other respondents (see attitude consensus manipulation). As in Experiment 1, this manipulation was designed to vary attitude certainty, which participants reported immediately following the consensus feedback. Finally, participants were presented with a second account of mineral donation ostensibly taken from WebMD.com. This second message contained only positive information and was identical across conditions with the exception that the message frame was varied to be either affective or cognitive (see message frame manipulation). After reading this second message, participants again reported attitudes.

Independent Variables

Orientation prime. All participants were exposed to the same initial information about mineral donation but were randomly assigned to focus on either their affective or cognitive reactions while reading the message. Participants in the *affective orientation* condition were instructed,

As you read this report, we would like you to focus on your emotional response to the message. Specifically, what are your feelings about mineral donation? What emotions come to mind as you read this information? Please focus on these emotions while viewing the transcript of the report.

Participants in the *cognitive orientation* condition received different instructions:

As you read this report, we would like you to focus on your cognitive response to the message. Specifically, what thoughts, beliefs, issues, or arguments come to mind about mineral donation as you read this information? Please focus on these thoughts while viewing the transcript of the report.

The intent of this manipulation was to induce a cognitive or affective orientation while holding the message itself constant across conditions.⁵

Attitude consensus. Participants were randomly assigned to receive either high or low consensus feedback. This manipulation was identical to the manipulation described in Experiment 1.

Message frame. The second message presented positive information about mineral donation. As with the orientation prime manipulation, all participants received the same core message across conditions. Of importance, though, this message was framed to focus on feelings or thoughts. For instance, participants in the feel (think) frame read,

I feel (think) that donating minerals is one of the most important contributions I can make to society. I also feel (think) that, by donating minerals, I can help save many lives. The last time I went to the donation center, the nurse that drew my minerals told me that given all the different ways they use donated minerals, my one donation could save up to six people's lives. . . . I feel (think) that is the most fantastic thing that I can do.

These materials were adapted from Mayer and Tormala (2010), who used this framing manipulation to successfully induce the perception of affective and cognitive messages while holding actual message content constant.⁶

Dependent Measures

Time 1 attitudes. Following the initial message and prime, participants reported their attitude by rating mineral donations on a single semantic differential scale ranging from 1 (*unfavorable*) to 9 (*favorable*).

Attitude certainty. Certainty was assessed using the following item (adapted from Clarkson et al., 2008): "How sure are you that your attitude toward mineral donation is right?" Responses were provided on scales ranging from 1 (*not sure at all*) to 9 (*extremely sure*).

Attitude change. Following the second message about mineral donations, participants again reported their attitudes toward mineral donations on the same item as at Time 1. An attitude change index was created by subtracting participants' Time 1 attitudes from their Time 2 attitudes. Thus, higher values indicated greater attitude change—that is, more persuasion in response to the second (positive) message.

Results

Time 1 attitudes. Because initial attitudes were assessed before the attack had been received, the Time 1 attitude data were submitted to a two-way ANOVA, with orientation prime and attitude consensus as the independent variables. No effects were significant ($p > .08$), suggesting that attitudes toward mineral donation were equivalent at the outset of the experiment (see Table 1). Furthermore, the grand mean ($M = 4.62$, $SD = 1.83$) was significantly lower than the midpoint of the attitude scale (5), $t(114) = -2.24$, $p < .03$, indicating that the initial message successfully induced negative attitudes.

Attitude certainty. We submitted attitude certainty to the same analysis, which revealed a main effect of consensus,

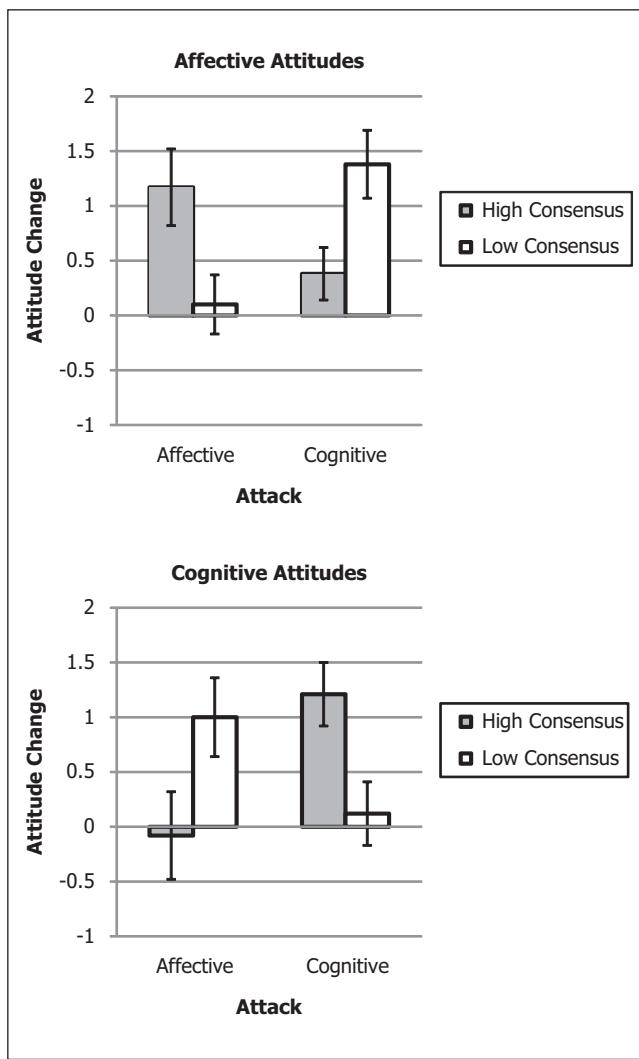


Figure 2. Attitude change as a function of consensus and attack condition for affective (top panel) and cognitive (bottom panel) attitudes in Experiment 2

$F(1, 111) = 4.29$, $p = .04$, $\eta^2_p = .04$. As expected, participants who received high consensus feedback ($M = 5.16$, $SD = 2.12$) reported greater attitude certainty than did participants who received low consensus feedback ($M = 4.41$, $SD = 1.91$). No other effects were significant ($Fs < 1$).

Attitude change. The attitude change index was submitted to a three-way ANOVA with orientation prime, attitude consensus, and message frame as independent variables. The analysis revealed a significant three-way interaction, $F(1, 107) = 15.70$, $p < .001$, $\eta^2_p = .17$ (see Figure 2).⁷ No other effects were significant (all $Fs < 1$). Most important, consistent with Experiment 1, the three-way interaction involved two opposing two-way interactions. For individuals with initially *affective* attitudes, there were no main effects ($Fs < 1$), but there was a significant consensus \times frame interaction, $F(1, 107) = 12.07$, $p = .001$, $\eta^2_p = .14$. Participants exposed to the feel (matched) frame evinced greater attitude

change after receiving high rather than low consensus feedback, $F(1, 107) = 5.70, p = .02, \eta^2_p = .07$. Conversely, participants exposed to the think (mismatched) frame evinced greater attitude change after receiving low rather than high consensus feedback, $F(1, 107) = 6.49, p < .02, \eta^2_p = .09$. For individuals with initially cognitive attitudes, there were no main effects ($F_s < 1$), but again we obtained a significant consensus \times frame interaction, $F(1, 107) = 10.36, p = .001, \eta^2_p = .12$. In this case, participants exposed to the think (matched) frame evinced greater attitude change after receiving high rather than low consensus feedback, $F(1, 107) = 7.08, p = .01, \eta^2_p = .09$, whereas participants exposed to the feel (mismatched) frame evinced greater attitude change after receiving low rather than high consensus feedback, $F(1, 107) = 4.06, p < .05, \eta^2_p = .05$.

Discussion

Experiment 2 replicated the key findings from Experiment 1, showing that increasing attitude certainty can open or close attitudes to change depending on whether those attitudes are the target of matched or mismatched persuasive messages. In addition, by holding message content constant, Experiment 2 offered stronger evidence that differences in affective or cognitive matching were driving the attitude change effects rather than another sort of content matching that naturally corresponds to manipulations of affect versus cognition. As a consequence, we were able to isolate the role of affective and cognitive orientations in attitudes and messages and bolster our confidence that certainty is indeed amplifying affective or cognitive matching.

General Discussion

Considerable research has shown that a counterattitudinal message that matches—as opposed to mismatches—one’s attitude orientation can generate substantial change in the direction of the counterattitudinal position. The present research sought to understand the role of attitude certainty in this classic persuasion effect. Across two experiments, participants who held their attitudes with high (vs. low) certainty showed greater attitude change toward an attack that matched (vs. mismatched) the orientation of their attitudes, regardless of whether that orientation was primarily affective or cognitive in nature. Moreover, change was indexed by differences in both attitudes (Experiment 1 and 2) and behavioral intentions (Experiment 1). Thus, attitude certainty appears to play an important and flexible role in altering the persuasive impact of matched and mismatched messages.

As reviewed earlier, the dominant perspective on attitude certainty casts certainty as an agent of crystallization, invariably strengthening an attitude by increasing its resistance to change (for reviews, see Gross et al., 1995; Tormala & Rucker, 2007). In contrast to this view and the extensive empirical evidence in support of it, the present research suggests that increasing attitude certainty can actually increase

an attitude’s openness to some counterattitudinal appeals. These findings are inconsistent with a crystallization view but compatible with the amplification hypothesis (Clarkson et al., 2008). As noted, this latter perspective posits that certainty can amplify an attitude’s resistance or openness to change depending on the dominant response or characteristic tendency of that attitude in a particular context. Under conditions in which attitudes often show openness to change (e.g., when persuasive appeals match the orientation of the target attitude), certainty amplifies rather than undermines that openness. Thus, under specifiable conditions, attitude certainty can act as a catalyst rather than obstacle to change.

Although we have argued that these effects are compatible with the amplification hypothesis, it is reasonable to ask whether our findings might be explained by existing theories on confidence, such as the self-validation hypothesis (Petty, Briñol, & Tormala, 2002). The self-validation hypothesis posits that, in addition to the number and valence of thoughts people have in response to persuasive messages, attitude change also is critically dependent on thought confidence. According to the self-validation perspective, thought confidence can increase persuasion or resistance depending on the type of thoughts to which it is linked (positive and negative thoughts about the message, respectively). Thus, for self-validation processes to explain the attitude change results in the current experiments, participants would need to generate different types of thoughts toward the Time 2 message across conditions. In particular, participants would need to generate *attitude-inconsistent* thoughts toward the matched message and *attitude-consistent* thoughts toward the mismatched message. If true, heightened thought confidence could amplify the impact of attitude-inconsistent thoughts in the matched case (i.e., more confidence leading to more change) and attitude-consistent thoughts in the mismatched case (i.e., more confidence leading to less change). Thus, gauging the viability of a self-validation account of our findings requires assessing the direction of thoughts generated toward the second message across conditions.

We examined this possibility by running an additional study ($N = 60$) in which participants completed the procedure outlined in Experiment 2 with the inclusion of a thought-listing task after the Time 2 message. Conditions were then collapsed to create a 2 (consensus: high or low) \times 2 (attack: matched or mismatched) between-participants design. A self-validation account would predict a main effect of attack on thought valence, such that participants would report unfavorable thoughts toward the mismatched message but favorable thoughts toward the matched message. However, participants in the matched ($M = 0.60, SD = 0.61$) and mismatched ($M = 0.66, SD = 0.52$) attack condition generated equally favorable responses to the positive message ($F < 1$). In fact, neither of the other effects was significant ($F_s < 1$). This null effect is understandable given that all participants were exposed to the same core content in the attacking message. Importantly, though, it does suggest that the

amplification perspective is not redundant with the self-validation hypothesis.

But if differences in thought valence across conditions cannot account for our findings (as posited by a self-validation account), then why does increased certainty boost change in response to matched messages? We suspect there are a number of possible explanations. For instance, certainty might increase (decrease) processing of matched (mismatched) messages, which would lead to greater (less) persuasion when those messages are strong (Petty & Cacioppo, 1986). Alternatively, perhaps certainty increases (decreases) the weight placed on matching (mismatching) information, giving it greater (less) persuasive impact. Or maybe certainty increases (decreases) the fluency or ease with which the matched (mismatched) messages are processed. Each of these mechanisms would be compatible with our general pattern of results, and they may occur independently or in tandem in this context. For now, our focus has been on documenting the counterintuitive effect of certainty on openness to change, but we see inquiries into the psychological mechanism underlying matching effects as a useful next step in this domain.

One means of identifying when one process might be more likely to operate than another would be to consider message recipients' motivation and ability to elaborate on the message they receive. Indeed, dual-process theories such as the elaboration likelihood model (Petty & Cacioppo, 1986) suggest that variables can play multiple roles in persuasion depending on where people are on the elaboration continuum (Petty & Wegener, 1998). Consider the effect of positive mood on persuasion. Positive mood generally has been shown to have a positive effect on persuasion, yet the mechanism through which it does so (e.g., acting as a cue or biasing thoughts) varies as a function of people's motivation and ability to process (see Petty, Schumann, Richman, & Strathman, 1993). Similarly, affective-cognitive matching generally increases persuasion, but the process through which this occurs might vary at different levels of elaboration (Petty et al., 2000). Whichever process happens to be operating in a given context is the one that should be amplified by increased certainty. Thus, the amplification hypothesis suggests that increased certainty will generally amplify matching effects, but possibly through different means at different points on the elaboration continuum—perhaps via a cue-based mechanism at low levels of elaboration or by biasing thoughts at higher levels of elaboration. We have identified amplified persuasion outcomes, but it remains to be seen how persuasion processes might vary as well.

Insights Into Matching

Although our experiments highlight a new role for certainty in moderating matching effects, we believe they also offer broader insights into when matching versus mismatching will be more persuasive. Especially intriguing from our point of view is the question of when mismatching will be

an effective persuasion strategy. Although matching effects generally prevail in this domain, there is limited evidence suggesting that messages that *mismatch* the orientation of the target attitude sometimes engender greater persuasion. Millar and Millar (1990), for instance, had participants solve several analytic puzzles after being given different instructions designed to increase the salience of the cognitive or affective orientation of their attitudes toward the puzzles. Participants were then presented with a persuasive attack that was either affective or cognitive in tone. Results revealed a mismatch effect, such that increasing the salience of the cognitive orientation of one's attitude promoted persuasion from the affective appeal, whereas increasing the salience of the affective orientation of one's attitude promoted persuasion from the cognitive appeal.

The current experiments demonstrated that although increased certainty bolstered the persuasive impact of matched messages, decreased certainty bolstered the impact of mismatched messages. That is, our findings reveal mismatching effects, but only under conditions of low attitude certainty. We surmise that the target issues used in the Millar and Millar (1990) studies (e.g., puzzles) might have provoked some degree of doubt or uncertainty. If true, the current studies, along with the Millar and Millar research, might converge in pinpointing low certainty as one condition for obtaining mismatching effects in persuasion. We look to future research to further explore this issue.

Insights Into Amplification

Of course, this research also tested divergent perspectives on attitude certainty. Our findings extend recent work on amplification effects while also raising new questions about other factors that affect amplification processes and outcomes. First, by focusing on cognitive and affective matching, the present research provides evidence for the amplification of *nonaversive* attitude effects. Recall that in the Clarkson et al. (2008) work, heightened certainty only increased the openness of ambivalent attitudes to change; univalent attitudes demonstrated greater resistance with greater certainty, a finding consistent with a crystallization perspective. Thus, prior evidence for the amplification hypothesis was limited to studies in which attitudes were ambivalent. Given that an ambivalent state typically is seen as aversive or as something people are motivated to resolve (e.g., Clark, Wegener, & Fabrigar, 2008; Maio, Bell, & Esses, 1996; Priester & Petty, 1996), it was unclear whether amplification effects would extend to nonaversive attitudes or even univalent attitudes more generally. In other words, although certainty might intensify the urge to change an attitude when people feel conflicted, it was possible that increasing certainty about a nonaversive univalent attitude would have the traditional crystallization effect. Our findings suggest that amplification effects are not confined to situations in which people are motivated to reconcile evaluative tension.

As a caveat, it is important to acknowledge that attitudes are multifaceted constructs. Some attitudes might have both aversive and nonaversive components. Similarly, although we manipulated attitudes to be primarily affective or cognitive in the current studies, many attitudes in the real world have both affective and cognitive underpinnings (e.g., liking a particular food because it is both tasty and healthy). Thus, it is possible that a given attitude could have numerous structural characteristics that spawn conflicting responses to a particular persuasive attack. Although this might be unimportant from a traditional crystallization perspective—which would predict that more certainty always makes an attitude more resistant to change—it is highly important from an amplification perspective. In the current domain, construing an attitude as affective or cognitive would be central to classifying its likely openness to affective or cognitive attacks. More generally, the amplification hypothesis suggests that understanding the malleability of structural components of attitudes, and how those components interact with features of the persuasive context, is crucial for predicting and shaping attitude change.

Conclusion

The present research was conducted to offer insight into the influence of attitude certainty on cognitive and affective matching effects. The results reveal an intriguing pattern, such that high certainty promotes openness to orientation-matching messages and resistance to orientation-mismatching messages. This pattern not only demonstrates the importance of certainty in the domain of matching effects but also provides supportive evidence for a new, more dynamic perspective on attitude certainty—the amplification hypothesis. We hope this research stimulates new attention to the possibility that both orientation-matching and orientation-mismatching messages can have a persuasive advantage, depending on structural and metacognitive aspects of the attitude in question.

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Notes

1. The origins of, or factors underlying, an attitude's dominant response could be multiple and presumably vary across contexts.

For example, ambivalent attitudes may be more inclined to change because ambivalence is an undesired state that people seek to escape (see Clark, Wegener, & Fabrigar, 2008). In the present research, our aim is not to focus on the underpinnings of a particular dominant response but rather to examine how certainty moderates the well-established response of affective or cognitive attitudes to matched versus mismatched messages.

2. We conducted two pilot studies to assess the extent to which the messages used in Experiment 1 varied on dimensions other than affective or cognitive orientation. In one study, 100 undergraduates were randomly assigned to receive one of the four messages used: positive affective message, positive cognitive message, negative affective message, or negative cognitive message. After reading the message, participants rated the extent to which it was general, specific, tangible, broad, concrete, impersonal, authentic, detached, objective, and extreme. Responses were obtained on scales ranging from 1 (*not at all*) to 9 (*very much*). The only item to show any differences across conditions was the extremity item, $F(3, 96) = 4.83, p < .01$ (all other $p > .17$). Post hoc contrasts revealed that within valence the affective or cognitive messages were no different in perceived extremity ($t < 1$). In general, however, participants did see the negative messages as more extreme than the positive messages, $t(97) = -3.63, p < .001$, perhaps reflecting a negativity bias whereby people react more strongly to negative than positive information (Rozin & Royzman, 2001). Most germane to our concerns, the affective and cognitive messages did not differ along any of the measured dimensions.

In a second pilot study, we examined whether the messages were seen as equally convincing, or persuasive, across conditions. Here, 59 participants were randomly assigned to receive one of the four messages from Experiment 1, and they rated the extent to which that message was effective, valid, compelling, and persuasive. Responses were given on 9-point scales, and a composite index was computed by averaging across items ($\alpha = .79$). Analysis revealed no differences in perceived persuasiveness across messages ($p > .33$). Thus, any differences observed in attitude change cannot be attributed to differences in how well the different messages were argued or how compelling a case they made.

3. Although we successfully manipulated relative differences in participants' attitude orientation, it is interesting to note that the association with cognitive (vs. affective) adjectives in the cognitive orientation condition was stronger than was the association with affective (vs. cognitive) adjectives in the affective orientation condition. From our perspective, relative differences in cognitive versus affective orientation across conditions should still permit relative differences in cognitive versus affective matching effects to emerge and allow us to examine whether certainty moderated these effects as hypothesized. Nevertheless, to address any concerns stemming from differences in association strength in Experiment 1, we pretested our orientation manipulation in Experiment 2 to ensure it created more balanced discrepancies in cognitive-affective orientation (see Note 5).

4. We present attitude change scores because difference scores offer a clear and straightforward index of persuasion. However, analysis of participants' Time 2 attitudes (controlling for Time 1 attitudes) also revealed a significant attitude orientation \times consensus \times attack interaction, $F(1, 116) = 41.93, p < .001$, in the same form as the change index (see Table 1 for means).
5. A pretest ($N = 36$) was conducted to assess the efficacy of the orientation prime manipulation by having participants read the initial message after being exposed to one of the different instructional sets. This manipulation had no effect on participants' initial attitudes toward mineral donation ($t < 1$), but it did alter the orientation of those attitudes, $t(34) = 3.36, p < .01$. Specifically, using the affective-cognitive discrepancy index from Experiment 1, we found that participants focusing on emotional responses had a more affective orientation ($M = 0.30, SD = 0.53$), whereas participants focusing on cognitive responses had a more cognitive orientation ($M = -0.44, SD = 0.61$).
6. To assess whether our manipulations altered the perceived strength of the Time 1 or Time 2 messages, we conducted a pre-test ($N = 80$) in which participants were randomly assigned to one of our four conditions and received the corresponding message used in that condition. Specifically, participants received the Time 1 message with an emotional set, the Time 1 message with a cognitive set, the Time 2 message with a "feel" frame, or the Time 2 message with a "think" frame. Participants then rated the message they read on two scales ranging from 1 (*weak, unconvincing*) to 9 (*strong, convincing*). Responses were averaged ($r = .75, p < .001$), and analysis revealed no significant differences across messages ($p > .19$).
7. Analysis of participants' Time 2 attitudes (controlling for Time 1 attitudes) also revealed a significant attitude orientation \times attitude consensus \times message frame interaction, $F(1, 106) = 16.60, p < .001$, in the same form as the attitude change index (see Table 1).

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