Social Cognition, Vol. 27, No. 1, 2009, pp. 105–127

PERSUASION BY CAUSAL ARGUMENTS: THE MOTIVATING ROLE OF PERCEIVED CAUSAL EXPERTISE

Stephanie J. Tobin and Melissa M. Raymundo
University of Houston

We examined how perceived causal expertise affects the processing of causal persuasive arguments. In Study 1, participants received strong or weak causal arguments from a content-area expert who was high or low in causal expertise. Participants in the high causal expertise condition processed the causal arguments carefully: they were more persuaded by strong compared to weak causal arguments. In Study 2, participants received a high or low causal confidence prime and then read a message from a source who was high or low in content-area expertise. The message contained strong or weak, causal or non-causal arguments. Participants who received both the causal confidence prime and the high content-area expertise information processed the causal arguments carefully: they were more persuaded by strong compared to weak causal arguments. These findings demonstrate that causal and content-area expertise can increase motivation to attend to causal arguments. Implications for the persuasion literature are discussed.

The findings of recent research suggest that when trying to change people's attitudes and beliefs, it is sometimes more important to explain *why* particular outcomes would occur than it is to provide evidence that suggests the outcomes would, in fact, occur (Slusher & Anderson, 1996; Tobin & Weary, 2008). Arguments that explain the causal mechanism responsible for some effect are called causal arguments. For instance, a causal argument against the legalization of casino gambling might claim that casinos attract those who can least afford it and then explain why (i.e., "because gambling offers low-income people a chance at riches and a solution to financial hardship," Tobin & Weary, 2008). A non-causal argument would

This research was supported by the University of Houston's New Faculty Research Program (2005). Some of the findings from Study 2 were presented as a poster at the 2006 meeting of the Society for Personality and Social Psychology in Palm Springs, CA.

Correspondence concerning this article should be addressed to Stephanie Tobin, Department of Psychology, University of Houston, Houston, TX 77204-5022. E-mail: stobin@uh.edu.

make the same claim, but then support it with covariation or statistical information (i.e., "at most of the country's casinos, low-income people make up about 78% of the crowd at the slot machines").

Slusher and Anderson (1996) argued that causal arguments should be more effective than non-causal arguments at changing people's social theories, or beliefs about how and why variables are related. They posited that the persistence of social theories depends upon the relative number of available causal explanations in support of a given theory compared to those opposing it. Causal arguments provide individuals with new explanations that help to shift the balance of explanations in favor of the desired conclusion. Consistent with this idea, Slusher and Anderson found that causal arguments were more effective than non-causal arguments in educating people about the transmission of AIDS, due to their effect on explanation availability. In addition, they found that causal arguments were not as subject to biased evaluation. That is, opposing initial beliefs led participants to discount non-causal evidence, but not causal evidence. Causal arguments have been applied in other areas as well. For example, in the area of drug marketing, Jalnawala and Wilkin (2007) presented participants with causal or non-causal arguments for a new prescription flu prevention medication. The non-causal arguments simply stated the characteristics of the drug (e.g., PrevFlu is convenient, safe, and easy to swallow), whereas the causal arguments explained the reasons for these properties (e.g., PrevFlu "is convenient because it requires only three oral doses per season," "is safe because it can be used for all ages," and "has a patented gel coating that makes it easy to swallow"). They found that for messages that acknowledged the negative features of the drug (as is required by the fair balance regulation), causal arguments produced more favorable beliefs about the drug and greater intentions to ask their physician about it.

Interest in causal arguments has arisen in part from an attempt to determine what exactly constitutes a strong argument. The importance of causal explanations has been established by decades of attribution research (for reviews, see Gilbert, 1998; Hilton, 2007). These researchers generally agree that people have a fundamental need to understand why events happen; it allows them to predict and control their outcomes in life and affords them a sense of psychological well-being (Heider, 1958; Weary & Edwards, 1994, 1996). Accordingly, it seems reasonable to posit that addressing causal mechanisms in persuasive communication would be effective.

In his review of social influence tactics, Pratkanis (2007) classified the use of causal arguments as storytelling. Much as jury members construct stories to explain the evidence presented to them during a trial (Hastie & Pennington, 2000; Pennington & Hastie, 1992), individuals reading persuasive arguments may construct causal models that capture the presented arguments. Such stories would facilitate comprehension of information and allow perceivers to decide on an appropriate course of action (e.g., convict vs. exonerate; accept vs. reject message). In addition, prior research shows that causal explanations can lead to belief perseverance (Anderson, Lepper, & Ross, 1980). That is, once someone has explained *why* a relationship exists, they will continue to believe it exists even if the evidence that prompted them to generate the explanation is discredited. Thus, it seems that causal explanations may be particularly powerful in persuasive appeals.

CAUSAL UNCERTAINTY, CAUSAL IMPORTANCE, AND CAUSAL ARGUMENTS

Recently, researchers have begun to examine variables that influence the extent to which people think carefully about causal arguments (Tobin & Weary, 2008). Greater thought is often desired in a persuasion setting because if the process underlying attitude change is thoughtful, any resulting change should be longer lasting and more resistant to counterpersuasion (Petty & Cacioppo, 1986). According to dual process models such as the Elaboration Likelihood Model (Petty & Cacioppo, 1986) and the Heuristic Systematic Model (Chaiken, 1987), individuals will think carefully about a message only when they are motivated and able to do so. One strategy that can increase a person's motivation to process a message is matching, or tailoring a part of the message to a salient aspect of the person (for reviews see Briñol & Petty, 2006; Petty, Wheeler, & Bizer, 2000). Matched messages seem more relevant than nonmatched messages, so individuals think about them carefully. As a result, persuasion depends upon the quality of the arguments in the message: people are more persuaded by strong compared to weak arguments.

Tobin and Weary (2008) noted that causal arguments could match the current concerns of some people better than other people. They examined whether individual differences in causal uncertainty and causal importance would affect people's motivation to process causal arguments. Causal uncertainty refers to doubts about one's own understanding of the causes of events in the social world, whereas causal importance refers to the perceived value of causal understanding (Weary & Edwards, 1996; Weary, Tobin, & Edwards, in press). Individuals who are high in both causal uncertainty and causal importance are highly motivated to improve their understanding of events, particularly when they encounter unexpected associations (e.g., when reading a counterattitudinal message). These individuals should perceive causal arguments as highly relevant to their current concerns and, as a result, should attend to them carefully.

Tobin and Weary (2008) found support for this prediction in two studies. When participants received a counterattitudinal message, only those who were high in both causal uncertainty and causal importance were more persuaded by strong compared to weak causal arguments. These findings demonstrate that at least for some issues (e.g., the legalization of casino gambling), individuals think carefully about causal arguments only when they have chronic concerns about why things happen.

PERCEIVED CAUSAL EXPERTISE AND CAUSAL ARGUMENTS

It is important to note, however, that matching is not the only way to increase elaboration. Increasing a source's level of perceived expertise also has been found to motivate individuals to think carefully about a message when they would not have done so otherwise. For instance, Heesacker, Petty, and Cacioppo (1983) found that an expert source prompted field-dependent participants, who typically devote few resources to message processing, to think carefully about a persuasive

message. As a result, they were more persuaded by strong compared to weak arguments. Heesacker et al. argued that source expertise increased participants' motivation to attend to the message by increasing their confidence in the potential accuracy of the message. Similarly, Moore, Hausknecht, and Thamodaran (1986) found that when it was possible but effortful to process a message (i.e., because it was presented at a moderately fast pace), participants' attitudes were based more on argument quality, indicating high levels of message elaboration, when the source was high compared to low in expertise.

It is possible, then, that high levels of perceived source expertise could motivate individuals to think carefully about causal persuasive arguments. As Heesacker et al. (1983) argued, when conditions do not constrain elaboration to be high or low, perceivers may expend their resources strategically, attending to those messages that are likely to be valid. However, when dealing with causal arguments, two facets of source expertise are relevant: *content-area expertise,* or a source's general knowledge about some field (e.g., gambling), and *causal expertise*, or a source's understanding of causal mechanisms. Past studies not concerned specifically with causal arguments typically have focused on content-area expertise. For instance, in Heesacker et al.'s (1983, pp. 657-658) study, a report in favor of senior comprehensive exams was prepared by "Dr. John Samuels, a professor of education at Princeton University" (high expertise) or John Samuels, a student in a journalism class at a local high school (low expertise). Similarly, in Moore et al.'s (1986, p. 94) study, a new calculator was described by "a professor of mathematics at Princeton University" or "a high school student from New Jersey."

A closer examination of prior research on causal arguments, however, reveals that attributing causal arguments to a source high in content-area expertise does not motivate elaborative processing in the average perceiver. Specifically, Tobin and Weary (2008) told all of their participants that the source of their antigambling message was a leading social scientist (Michael Thompson, Ph.D., from the Institute for the Study of Social Issues), but only participants who were chronically preoccupied with improving their causal understanding thought carefully about his causal arguments. In order to motivate the average perceiver, it might be necessary to also increase the source's level of perceived causal expertise. When a source is high in both content-area and causal expertise, he or she is capable of producing valid causal explanations. Perceivers who are not otherwise motivated to attend to causal arguments may do so under these conditions in order to learn the underlying causes of the arguments and improve their causal knowledge.

THE CURRENT RESEARCH

We tested this hypothesis in two studies. In Study 1, we explicitly told participants that the author of a message (who was always high in content-area expertise) either did or did not have a good grasp on cause-effect relationships. In Study 2, we primed participants to feel confident or doubtful about other people's grasp of cause-effect relationships in a seemingly unrelated task. We then presented participants with causal or non-causal arguments which were attributed to a source who was high or low in content-area expertise. In both studies, we manipulated argument quality in order to examine participants' levels of message elaboration. We expected to observe the largest argument quality effect, indicating high levels

of elaboration, when a source perceived as high in both content-area and causal expertise offered causal arguments.

STUDY 1

In Study 1, we presented all participants with a counterattitudinal message that argued against extending the length of Spring Break.[1] The source of the message was always high in content-area expertise and the message always contained causal arguments. However, we manipulated the quality of the causal arguments (strong or weak) and the causal expertise of the source (high or low). We predicted that participants would think more about the causal arguments when the source was high compared to low in causal expertise. As a result, they should be more sensitive to the argument quality manipulation and adopt the position of the message more when the arguments were strong compared to weak.

PARTICIPANTS

One hundred eleven undergraduate psychology students participated in the study for extra credit. Participants were randomly assigned to conditions in this 2 (causal expertise: high, low) X 2 (argument quality: strong, weak) between-subjects factorial design. The data from 14 participants were excluded: seven participants did not spend adequate time on the computer screen containing the causal expertise information (less than 6 seconds), four participants indicated some awareness of the purpose of the causal expertise manipulation, two participants skipped through one or more of the questions in fewer than 300 milliseconds (Bargh & Chartrand, 2000), and one person knew an individual who shared the source's name.

After these exclusions, the sample consisted of 13 male (13%) and 84 female (87%) participants. Participants ranged in age from 18 to 58 years old (M = 22.75). The ethnic composition of the sample was 26% Asian American, 23% Caucasian, 23% African American, 18% Hispanic, 9% Other, and 2% International.

PROCEDURE

Participants were run in groups of one to seven; however, each participant was assigned to an individual computer station. All study materials were presented via MediaLab (Jarvis, 2004). Participants were told that they were taking part in a study that examines people's perceptions of issues in the social world. They learned that they would be asked to read a short essay that had appeared recently

1. Sixty-two participants had rated their attitudes toward a Spring Break extension in a pilot study. The median score was 5 on a 6-point scale, where 1 indicated strong disagreement and 6 indicated strong agreement with the extension (M = 4.00, SD = 2.09). Overall then, participants were in favor of the extension. In addition, attitude certainty was rather high. The median certainty score was 6 on scale of 1 (not at all certain) to 6 (extremely certain; M = 5.19, SD = 1.27). Based on these data, it seemed reasonable to assume that most participants in the main study would have found the anti-extension position of the message to be counterattitudinal.

in a local newspaper, in response to an open call for opinions about recent changes happening at some universities in the U.S. They were told that they would be asked to answer some questions about the essay when they had finished reading it.

Content-Area Expertise Information. All participants were informed that the essay had been submitted by Dr. Jason Phillips, a leading social scientist who specializes in the health and well-being of university students. They further read that Dr. Phillips had been conducting research on predictors of physical and psychological well-being for over 25 years and had published over 40 articles and 5 books on the topic. This information indicates a high level of content-area expertise.

Causal Expertise Manipulation. In the high causal expertise condition, the paragraph went on to say that Dr. Phillips "is well respected for his understanding of people's thoughts, feelings, and behavior. Not only can he predict the effects that various policies will have on students, he is also very good at pinpointing the underlying causes." In contrast, in the low causal expertise condition, the final sentences of the paragraph read "However, oftentimes people doubt his understanding of people's thoughts, feelings, and behavior. He can predict the effects that various policies will have on students, but he is not very good at pinpointing the underlying causes."

Argument Quality Manipulation. Participants then read a counterattitudinal persuasive message that argued against extending the length of Spring Break from one to two weeks. The author began by claiming that there had been recent talk at some universities about extending the length of Spring Break. He mentioned that some universities in the U.S. and a number of universities overseas already have a longer break. However, he went on to argue that a careful examination of the issue revealed that the two-week Spring Break might not be as good as it seems. The author offered three causal arguments in support of his position. Depending upon argument quality condition, the arguments were either strong or weak. Similar to the approach taken by Tobin and Weary (2008, Study 1), the strong arguments described very undesirable consequences while the weak arguments described somewhat undesirable consequences. Specifically, in the strong argument condition, the author argued that students would experience negative emotions during the extended break, and increased stress levels and lower grades upon their return to school. In the weak argument condition, he argued that students would not be able to check their e-mail as much as they would like to, and that they would experience higher instances of sleeping in and reduced reading efficiency upon return to school.

All arguments contained causal explanations. For example, stress was said to increase with the extended break "because the longer students are away from their classes, the more effort it takes to start up again." Similarly, rates of sleeping in were said to increase "because the longer students go without waking up early, the more their sleep cycles reset themselves." In all conditions, the author ended by recommending that Spring Break should not be extended, claiming no real benefits and some potential costs for students.

Dependent Measures. Next, participants were told that because their personal views about extending the length of Spring Break from one to two weeks might influence their impressions of the essay, a measure of their own opinion on the is-

sue was desired. On a 7-point semantic differential scale, participants rated the favorability of a two-week Spring Break (unfavorable; favorable). Participants then rated on 7-point scales the author's level of knowledge, causal understanding, and likability. They also were asked to rate the desirability (-3 = very undesirable; +3 = very desirable) of each of the three consequences in the essay (i.e., increased negative emotions, stress levels, and lower grades in the strong argument condition; decreased e-mail usage, reading efficiency, and more oversleeping in the weak argument condition).

To probe for suspicion about our hypotheses, we asked participants what they thought the study had been about. After responding to this item, participants were debriefed and thanked for their participation.

RESULTS

PERCEPTIONS OF THE SOURCE

To check on the effectiveness of our causal expertise manipulation, we conducted 2 (causal expertise) X 2 (argument quality) ANOVAs on perceptions of the source's knowledge, causal understanding, and likability. We expected our causal expertise manipulation to primarily affect perceptions of the source's causal understanding, rather than his general knowledge or likability. As predicted, these analyses revealed only a main effect of causal expertise on perceived causal understanding, $F(1, 93) = 16.62$, $p < .001$. Participants thought the source understood the underlying causes of events better in the high ($M = 5.50$) compared to low ($M = 4.29$) causal expertise condition. There were no significant effects on perceived likability, ps > .17.

Although there were no significant effects on perceived general knowledge, the causal expertise main effect approached significance, $F(1, 93) = 3.45$, $p < .07$. Participants thought the author was more knowledgeable in the high ($M = 5.21$) compared to low ($M = 4.69$) causal expertise condition. Because this finding suggests some degree of overlap between general knowledge and causal expertise, we conducted an ANCOVA to examine whether the effect of our causal expertise manipulation on perceived causal understanding remained significant when we controlled for perceived knowledge. This analysis revealed that the effect of causal expertise condition on perceived causal understanding remained significant, $F(1, 92) = 13.51$, $p < .001$, when we controlled for perceived knowledge.

We then conducted an additional ANCOVA to examine whether the effect of causal expertise condition on perceived knowledge remained marginally significant when we controlled for perceived causal understanding. This analysis revealed that the effect of causal expertise condition on perceived knowledge was not significant, $F(1, 92) = 0.84$, $p = .36$, when we controlled for perceived causal understanding. These analyses support the idea that although there was some spillover to perceived general knowledge, our causal expertise manipulation had a stronger influence on perceived causal understanding.

PERCEPTIONS OF THE ARGUMENTS

Next, we examined perceptions of the arguments. We created a consequence desirability index ($\alpha = .70$) by averaging together the three desirability ratings. Then, we conducted a 2 (causal expertise) X 2 (argument quality) ANOVA on perceived consequence desirability. As predicted, we observed only a main effect of argument quality, $F(1, 93) = 42.40$, $p < .001$. Participants viewed the consequences of the Spring Break extension as less desirable in the strong ($M = -2.00$) compared to weak ($M = -0.34$) argument condition.

ATTITUDES

Before examining attitudes, we reverse-scored responses so that higher numbers indicated greater negativity toward a two-week Spring Break, or greater persuasion. Next, we tested our central hypothesis with a 2 (causal expertise) X 2 (argument quality) ANOVA. This analysis revealed only the predicted two-way interaction, $F(1, 93) = 4.39$, $p < .05$. (See Figure 1.) Recall that we had anticipated a larger argument quality effect in the high causal expertise condition. Because we had specific directional predictions (i.e., more persuasion by strong compared to weak arguments), we employed one-tailed tests of significance for our planned comparisons and simple slope tests. Planned comparisons revealed that the argument quality effect was significant in the high causal expertise condition, $t(93) = 1.79$, $p < .05$. Participants were more persuaded by the strong ($M = 4.00$) compared to weak ($M = 3.04$) causal arguments. However, there was no significant effect of argument quality in the low causal expertise condition, $t(93) = -1.17$, $p = .13$.

Next, we conducted two regression analyses to test the idea that perceived causal understanding, rather than general knowledgeability, increased elaboration. Specifically, we examined whether perceived causal understanding or perceived knowledge interacted with argument quality to predict attitudes. We first standardized attitudes, perceived causal understanding, and perceived knowledge. Argument quality was effects-coded (+1 = strong argument, -1 = weak argument).

In the first regression analysis, attitudes were regressed on argument quality, perceived causal understanding, and the interaction. The Argument Quality X Perceived Causal Understanding interaction was significant, $\beta = .21$, $t(93) = 2.04$, $p < .05$. Simple slopes tests revealed a significant effect of argument quality for participants one standard deviation (*SD*) above the mean on perceived causal understanding, $\beta = .25$, $t(93) = 1.74$, $p < .05$. Participants who rated the source as having a relatively high level of causal understanding were more persuaded by strong compared to weak arguments. The comparable slope was nonsignificant for participants one *SD* below the mean on perceived causal understanding, $\beta = -.16$, $t(93) = -1.15$, $p = .13$.

In the second regression analysis, attitudes were regressed on argument quality, perceived knowledge, and the interaction. There were no significant effects, ps > .53. Thus, higher levels of perceived general knowledge were not associated with increased elaboration.

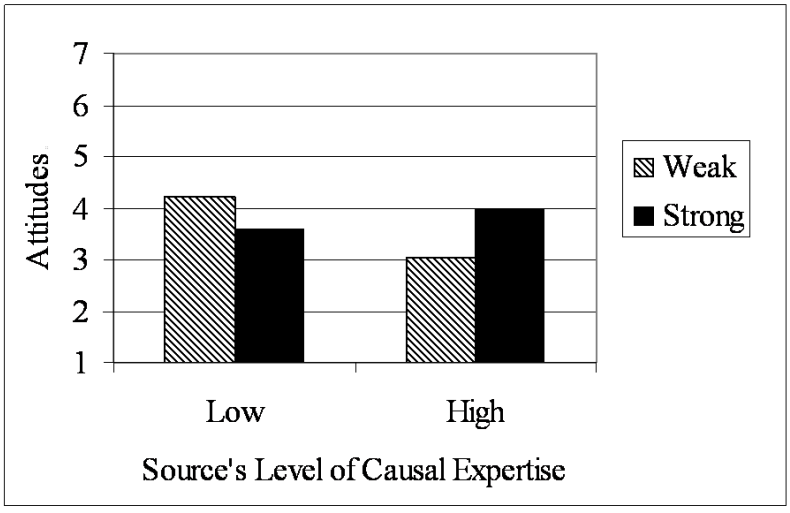

FIGURE 1. Effects of causal expertise and argument quality on attitudes in Study 1.
Note. Higher numbers indicate greater negativity toward the extension, or greater persuasion.

DISCUSSION

Analyses revealed that participants recognized that the consequences of the Spring Break extension were less desirable in the strong compared to weak argument condition. However, as predicted, an examination of participants' attitudes toward the extension revealed a significant argument quality effect only in the high causal expertise condition. These participants were more persuaded by strong compared to weak arguments. This effect is consistent with the idea that participants attended to the causal arguments only when they expected them to be valid.

Our examination of source perceptions supported the distinction between general and causal expertise. We found that the causal expertise manipulation had the strongest influence on perceptions of the source's causal understanding, compared to his general knowledge or likability. Importantly, even though the causal expertise manipulation had somewhat of an effect on perceived knowledge, only perceived causal understanding had the predicted effect on attitudes.

Last, we should note that although the absolute level of persuasion in the high causal expertise/strong causal argument condition was not substantially greater than that observed in the low causal expertise conditions, the presence of the argument quality effect indicates that participants engaged in relatively high levels of elaboration. This implies that any observed attitude change will likely persist longer over time and be more resistant to future challenges (Petty & Cacioppo, 1986). Persuasion in the low causal expertise condition, on the other hand, is likely to be short lived. Overall, the findings of Study 1 support the idea that the source's level of perceived causal expertise affects the average participant's motivation to process causal arguments.

STUDY 2

In Study 2, we sought to replicate the findings of Study 1 using a different manipulation of perceived causal expertise. We were particularly interested in whether perceivers' internal states could contribute to their perceptions of causal expertise. Just as individuals differ in their chronic and temporary doubts about their *own* explanations (Weary & Edwards, 1994, 1996), they also likely differ in their chronic and temporary perceptions of *other people's* explanations. To see if such internal states affected interest in causal arguments, we primed causal confidence in Study 2.

Past studies have used various types of priming manipulations to temporarily alter participants' perceptions of their own causal understanding of events (Weary, Jacobson, Edwards, & Tobin, 2001; Wichman, Brunner, & Weary, 2008). These researchers argued that even individuals without chronic causal uncertainty know what it is like not to understand something and that priming them with statements expressing causal uncertainty increases the accessibility of these beliefs. Similarly, it seems reasonable to assume that most people have experienced, at times, confidence or doubt in another person's understanding of the causes of events. Therefore, it should be possible to temporarily alter their perceptions of other people's causal understanding of events with a priming manipulation.

We thought that primed confidence in other people's causal explanations would have a similar effect on the processing of causal arguments as did the explicit causal expertise information in Study 1. A generalized sense that others understand why events occur should give one some degree of confidence that a particular other (e.g., the source of the message) will understand. However, when the source lacks content-area expertise confidence should drop, because both causal and content-area expertise are necessary for the production of valid causal arguments. Thus, we expected participants to think carefully about a source's causal arguments only when they feel that the source understands why events occur and possesses expertise in the content area.

To test this hypothesis, we primed participants with a high or low level of causal confidence and then presented them with a persuasive message that argued against a longer Spring Break. As in Study 1, we manipulated the quality of the arguments in the message (strong or weak) so that we would have an indicator of message elaboration. We also manipulated the source's level of content-area expertise (high or low) and the type of arguments (causal or non-causal) so that we could test the hypothesis that causal confidence affects message elaboration only when content-area expertise is high and causal explanations are present. We predicted that the highest levels of message elaboration would occur in the high causal confidence/high content-area expertise/causal argument condition. These participants should be more persuaded by the strong compared to weak arguments. We also assessed cognitive responses so that we could examine whether this effect was due to more favorable thoughts about the message. When participants are thinking carefully, they should generate more favorable thoughts about the issue after reading the strong compared to weak arguments, and these thoughts should predict their attitudes (Petty & Cacioppo, 1986).

METHOD

PARTICIPANTS

One hundred eighty undergraduate psychology and marketing students participated in the study for extra credit. Participants were randomly assigned to conditions in this 2 (causal confidence prime: high, low) X 2 (content-area expertise: high, low) X 2 (argument type: causal, non-causal) X 2 (argument quality: strong, weak) between-subjects factorial design. The data from 5 participants were excluded: 3 participants skipped through one or more of the questions in fewer than 300 milliseconds (Bargh & Chartrand, 2000) and 2 participants indicated some awareness of the purpose of the scrambled sentence task during the funnel debriefing.

After these exclusions, the sample consisted of 45 male (26%) and 130 female (74%) participants. Participants ranged in age from 18 to 47 years old (M = 24.23). The ethnic composition of the sample was 31% Caucasian, 25% Asian American, 22% Hispanic, 13% African American, 7% Other, and 2% International.

PROCEDURE

Participants were run in groups of one to seven, but each participant was assigned to an individual cubicle containing a computer and a paper-and-pencil questionnaire packet. The questionnaire packet contained a scrambled-sentence priming task and a consumer survey. Participants were told that since the main study would not take the full time, researchers first were presenting two short studies for other researchers. Participants were asked to complete the paper-and-pencil packet before starting the computer-based study.

Priming Task. Following the procedure recommended by Bargh and Chartrand (2000), we told participants that the scrambled-sentence task was part of a linguistics project for use with high school students. We instructed participants to write down a grammatically correct four-word sentence for each of the five-word sets that followed. In other words, participants would have to rearrange the words to make a meaningful sentence, leaving out one of the words in the set. The instructions told them to work quickly, without spending too long on any given item. An example sentence followed, along with 20 word sets: 10 active sentences that were relevant to other people's causal understanding of events and 10 filler sentences. See Appendix A.

Depending upon condition, the active sentences portrayed others as either understanding or not understanding the causes of events. The word sets were based in part on sentences used by Wichman et al. (2008). However, we modified the target pronouns from personal pronouns (me, I, and my) to other-relevant pronouns (he, she, they, him, her, and them). In half of the active word sets, one of the causally-relevant words was included in the four-word sentence. In the other half, the causally-relevant word was the excluded word. However, because causal understanding is a complex construct, sometimes both the included and excluded words were used to convey high or low levels of causal understanding. After un-

scrambling all twenty word sets, participants rated how difficult the sentences were, and how difficult they would be for a high school student.

Participants then completed a filler task. Specifically, they were asked to indicate how often they consumed various beverages and went to various restaurants. This survey was included because previous research using a similar priming task found that the primed construct had more of an influence on the dependent measure after a brief delay (Wichman et al., 2008). After the consumer items, participants were asked to place the questionnaire packet on top of the computer and turn on the monitor in order to begin the main study.

Persuasive Message. Next, in an ostensibly unrelated study, we told participants that they were going to read a short essay that had appeared recently in a local newspaper about changes happening at some universities in the U.S. Depending upon content-area expertise condition, participants were told that the essay had been submitted by either a leading social scientist who specializes in the health and well-being of university students (high content-area expertise), or a dental technician who is interested in sending his children to university when they get older (low content-area expertise). Furthermore, at the top of the computer screen displaying the essay, the author was listed as either Jason Phillips, Ph.D., Social Scientist (high content-area expertise) or Jason Phillips, Dental Technician (low content-area expertise), depending on condition.

We used the same strong and weak causal arguments that we had used in Study 1. For the non-causal arguments, instead of explaining why the negative consequences would occur, we provided statistical information that suggested that the effects would occur (Slusher & Anderson, 1996; Tobin & Weary, 2008). For example, to support the idea that stress levels would increase, we stated that "studies have found that vacations longer than 5 to 7 days increased post-vacation stress among students by up to 16%." Similarly, to support the idea that rates of sleeping in would increase, we stated that "studies have found that vacations longer than 5 to 7 days almost doubled the number of post-vacation snooze presses."

Dependent Measures. Five items tapped participants' attitudes toward the extended break. Participants rated the extended break on four 7-point semantic differential scales: unfavorable/favorable, bad/good, foolish/wise, and harmful/beneficial. They also rated the extent to which they agreed with the proposal that Spring Break should be extended from one week to two weeks on a scale of 1 (do not agree at all) to 7 (agree completely).

Next, participants were asked to list the thoughts they had while reading the essay. They were told simply to write down the thoughts that came to their minds, ignoring spelling, grammar, and punctuation (a phrase could be sufficient). They were urged to be completely honest and list all thoughts they had. Further, they were asked to list as many thoughts as they could, but to enter only one per box. They were able to enter up to eight thoughts.

As in Study 1, participants rated the desirability of the three consequences mentioned in the essay. In addition, to examine whether our causal confidence prime affected participants' own feelings, we included a 4-item measure of current uncertainty feelings. The items were based in part on those used by Vaughn and Weary (2003). We asked participants to indicate on 5-point scales (not at all; extremely) the extent to which they currently felt uncertain, confused, confident (reversed),

and doubtful. We also asked participants to indicate how happy they were in order to get at general positive affect.

Lastly, following Bargh and Chartrand's (2000) recommendations, we conducted a funnel debriefing at the end of the experiment to probe for suspicion. Specifically, we first asked participants to describe what they thought the purposes of the studies had been. Next, we asked whether they thought that the studies were related in any way (yes or no). If they indicated that they were related, we asked them to describe how they were related. Then, we asked participants whether anything they did in the short studies packet could have influenced what they did on the rest of the tasks (yes or no). If they indicated that it could have, we asked them to describe the nature of the influence. Last, we asked participants whether they had noticed a theme to the sentences that they constructed in the short studies packet (yes or no). If they indicated that there was a theme, we asked them to describe it. Only 2 of the 180 participants expressed any awareness of the purpose of the scrambled sentence task, and as indicated earlier, their data were excluded from the analyses.

RESULTS

PERCEPTIONS OF THE SOURCE

We pilot tested the causal confidence prime and content-area expertise information in a separate study ($n = 64$). Depending upon condition, participants received the high or low causal confidence prime and then the high or low content-area expertise information. Without having read the persuasive message, participants rated on 7-point scales how qualified the author was to write about extending the length of Spring Break, how valid they thought the author's arguments would be, and how well the author would understand the underlying causes of any negative consequences associated with a longer break. The first two items assessed content-area expertise while the last one assessed causal expertise.

Analyses revealed content-area expertise main effects on perceived qualifications, $F(1, 60) = 28.43$, $p < .001$, validity, $F(1, 60) = 10.12$, $p < .01$, and causal understanding, $F(1, 60) = 21.15$, $p < .001$. Compared to the dental technician, the social scientist was seen as more qualified ($M = 4.81$ vs. 2.88), likely to provide more valid arguments ($M = 4.63$ vs. 3.56), and likely to better understand the causes of any break-related outcomes ($M = 5.00$ vs. 3.47). We also observed a significant Causal Confidence Prime X Content-Area Expertise interaction on perceived causal expertise, $F(1, 60) = 3.88$, $p = .05$. The comparable interaction was not significant for how qualified or how valid, ps $> .26$.

As in Study 1, it seemed there was some potential overlap between content-area and causal expertise. To ensure that our observed effects on perceived causal understanding were not due to perceived content-area expertise, we conducted an ANCOVA with perceived validity as a covariate (perceived qualification was not a significant covariate). The Causal Confidence Prime X Content-Area Expertise interaction remained significant, $F(1, 59) = 7.88$, $p < .01$, when we controlled for perceived validity. Planned comparisons on the adjusted means revealed that perceptions of the social scientist's causal understanding were higher when par-

ticipants had received the high (M = 5.08) compared to low (M = 4.41) confidence prime, $t(59) = 1.60$, $p < .06$. Conversely, perceptions of the dental technician's causal understanding were lower when participants had received the high (M = 3.22) compared to low (M = 4.22) confidence prime, $t(59) = -2.41$, $p < .01$.

The confidence prime boosted perceptions of the source's causal understanding when he was described as a content-area expert. This finding is consistent with the idea that valid causal arguments require both causal and content-area expertise. However, unexpectedly the causal confidence prime reduced confidence in the source's causal understanding of events when he was low in content-area expertise. This effect may have been due to comparison processes (e.g., compared to others who understand the causes of events, this person seems ill suited to explain the causes of events in this domain).

PERCEPTIONS OF THE ARGUMENTS

As in Study 1, we created a consequence desirability index (α = .72) by averaging together the three desirability ratings. Then, we conducted a 2 (primed causal confidence) X 2 (content-area expertise) X 2 (argument type) X 2 (argument quality) ANOVA on perceived consequence desirability. As in Study 1, we observed only a main effect of argument quality, $F(1, 159) = 30.51$, $p < .001$. Participants viewed the consequences of the Spring Break extension as less desirable in the strong (M = -1.63) compared to weak (M= -0.49) argument condition.

ATTITUDES

Participants' responses to the five attitude items first were reverse-scored such that higher numbers indicated greater persuasion. These items were averaged to create an attitude index (α = .95). Next, we tested our main predictions with a 2 (primed causal confidence) X 2 (content-area expertise) X 2 (argument type) X 2 (argument quality) ANOVA on the attitude index. We observed a main effect of argument quality, $F(1, 159) = 7.21$, $p < .01$. Strong arguments (M = 4.68) were more persuasive than weak arguments (M = 4.00). However, we also obtained the predicted 4-way interaction, $F(1, 159) = 4.09$, $p < .05$. (See Figure 2.)

Recall that we had expected this interaction to be driven by enhanced scrutiny of the causal arguments (i.e., a large argument quality effect) among participants who should have felt particularly confident in the source's causal understanding of events (i.e., high causal confidence and high content-area expertise). To examine the interaction in a systematic fashion, we broke down the sample by confidence conditions. We first conducted 2 (source expertise) X 2 (argument type) X 2 (argument quality) ANOVAs within prime condition. Consistent with our predictions, we found that the 3-way interaction was significant only when participants had been primed to feel confident in other people's causal understanding, $F(1, 81) = 4.03$, $p < .05$. There were no significant effects in the low causal confidence condition, ps > .13.

From there, we found that the 3-way interaction in the high causal confidence condition was driven by the presence of a significant Argument Type X Argument Quality interaction in the high content-area expertise condition, $F(1, 40) = 4.40$, p

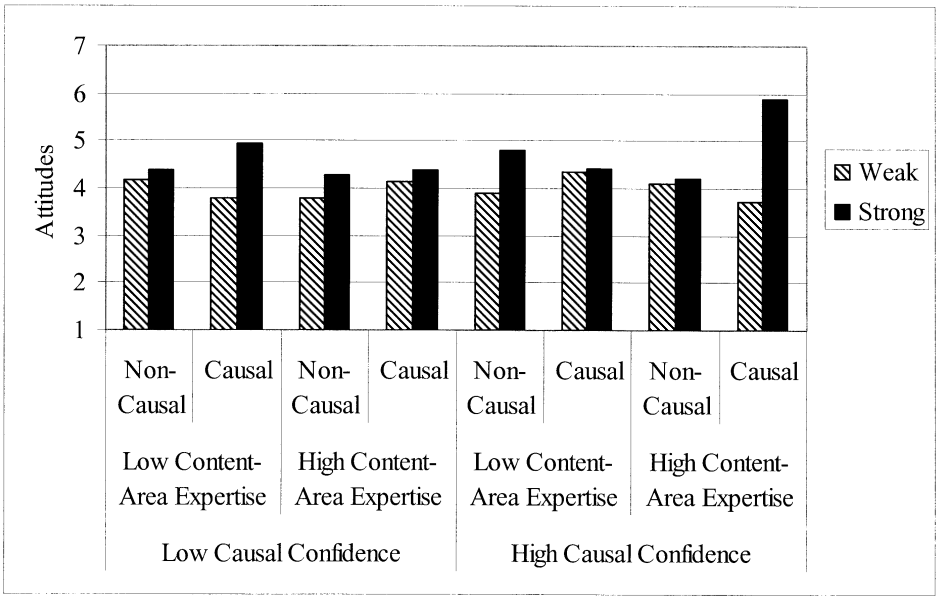

FIGURE 2. Effects of primed causal confidence, content-area expertise, argument type, and argument quality on attitudes in Study 2.

Note. Higher numbers indicate greater negativity toward the extension, or greater persuasion.

< .05. There were no significant effects in the low content-area expertise condition, *p*s > .34.

Last, we examined the Argument Type X Argument Quality interaction in the high causal confidence/high content-area expertise condition with planned comparisons. As expected, we found evidence of argument scrutiny only in the causal argument condition, $t(40) = 3.12$, $p < .01$. That is, in the causal argument condition, participants were significantly more persuaded by strong ($M = 5.89$) compared to weak ($M = 3.71$) arguments. However, in the non-causal argument condition, strong ($M = 4.22$) and weak ($M = 4.11$) arguments were equally persuasive, $t(40) = 0.16$, $p = .44$.

THOUGHT FAVORABILITY

We then turned to participants' cognitive responses. We would expect participants who appeared to be thinking carefully (i.e., those in the causal confidence prime/high content-area expertise/causal argument condition) to generate more favorable issue-relevant thoughts when they had received strong compared to weak arguments (Petty & Cacioppo, 1986). We also would expect them to base their attitudes upon their issue-relevant thoughts, such that more favorable thoughts predict greater persuasion. Moreover, we predicted that thought favorability would mediate the effect of argument quality on attitudes for this group of participants: the argument quality effect should become nonsignificant when we control for thought favorability.

To examine this possibility, we first had a research assistant who was blind to condition code participants' issue-relevant thoughts as favorable, unfavorable, or neutral with respect to the author's position (Cacioppo, Harkins, & Petty, 1981; Cacioppo & Petty, 1981; Petty & Cacioppo, 1986). We then created an index of thought favorability by subtracting the number of unfavorable from favorable thoughts and dividing by the total number of favorable and unfavorable thoughts. A second research assistant coded a subset of the thoughts ($n = 30$) so that we could examine inter-rater reliability. As expected, thought indices based on the two sets of ratings were highly correlated, $r = .80$, $p < .001$.

Next, following standard recommendations for testing mediational models (Baron & Kenny, 1986; Muller, Judd, & Yzerbyt, 2005), we conducted a series of regressions in order to examine whether greater persuasion by strong compared to weak arguments among participants in the causal confidence prime/high content-area expertise/causal argument condition was due to more favorable cognitive responses. First, we established that argument quality (+1 = strong, -1 = weak) predicted attitudes, $\beta = .54$, $t(20) = 2.84$, $p < .05$. Stronger arguments led to greater persuasion. Second, we found that argument quality predicted thought favorability, $\beta = .51$, $t(20) = 2.63$, $p < .05$. Stronger arguments led to more favorable thought profiles. Third, we showed that controlling for argument quality, thought favorability predicted attitudes, $\beta = .57$, $t(19) = 3.16$, $p < .01$. More favorable thought profiles were associated with greater persuasion. Fourth, we found that after controlling for thought favorability, argument quality did not significantly predict attitudes, $\beta = .25$, $t(19) = 1.35$, $p = .19$. A Sobel test (Sobel, 1982) revealed that the drop in magnitude of the argument quality effect on attitudes when thought favorability was controlled was significant, $Z = 2.02$, $p < .05$. Thus, our findings revealed that thought favorability mediated the observed effect of argument quality on attitudes. We should note that thought favorability did not interact with argument quality to predict attitudes, $p = .68$.

UNCERTAINTY FEELINGS AND AFFECT

After reverse scoring the appropriate item, we averaged together the four uncertainty items ($\alpha = .68$). A 2 (primed causal confidence) X 2 (content-area expertise) X 2 (argument type) X 2 (argument quality) ANOVA revealed no significant main or interactive effects of the prime, ps > .15, or of any of the other variables, ps > .07. Next, we examined the happiness item. A 2 X 2 X 2 X 2 ANOVA revealed no significant effects associated with prime condition, ps > .12, or any of the other variables, ps > .05. Thus, our prime did not affect participants' personal levels of uncertainty or happiness.

In addition, we examined whether our predicted 4-way interaction on attitudes remained significant when we controlled for uncertainty feelings. We first checked to see if there were any significant interactions between uncertainty feelings and our other predictors. There was a significant Argument Quality X Uncertainty Feelings interaction, $\beta = .18$, $t(143) = 2.14$, $p < .05$. Simple slope tests revealed a significant argument quality effect at 1 *SD* above the mean on uncertainty feelings, $\beta = .40$, $t(143) = 3.36$, $p < .001$, but not at 1 *SD* below the mean on uncertainty feelings, $\beta = .03$, $t(143) = 0.26$, $p = .40$. This finding is consistent with previous research

which has found that self-directed uncertainty can increase elaboration (Tiedens & Linton, 2001). Importantly, when we entered uncertainty feelings and their interaction with argument quality as covariates in an ANCOVA, our predicted 4-way interaction remained significant, $F(1, 157) = 4.61$, $p < .05$.

Happiness had no significant main or interactive effects on attitudes. When we included happiness as a covariate in an ANCOVA, our predicted 4-way interaction remained significant, $F(1, 158) = 3.86$, $p = .05$.

DISCUSSION

In Study 2, primed causal confidence and content-area expertise together led to a greater scrutiny of the source's causal arguments, as evidenced by the relatively large argument quality effect. In addition, an examination of participants' cognitive responses to the causal arguments in the causal confidence prime/high content-area expertise condition revealed that thought favorability mediated the effect of argument quality on attitudes. This finding further supports the idea that participants in the causal confidence prime/high content-area expertise condition were thinking carefully about the causal arguments.

The inclusion of a non-causal condition in Study 2 helped to demonstrate that the combined effect of causal confidence and content-area expertise on persuasion was specific to causal arguments. This effect supports the idea that our prime affected confidence in the *causal* realm, rather than confidence in general.

Readers may wonder whether our prime might have affected perceptions of oneself rather than others or affect rather than uncertainty. We think these possibilities are unlikely for several reasons. First, in Study 2, we found that our prime did not affect participants' own levels of confidence or happiness. Rather, the prime likely established an expectancy that a subsequently encountered individual (e.g., the source of the persuasive message) would or would not understand why events happen. Low expectancies would have resulted in low motivation to process the message, but not to uncertainty. Perceivers simply would have expected the source not to understand and paid little attention to his explanations. High expectancies would have resulted in higher motivation to process the message, unless other cues undermine these expectancies (e.g., low content expertise).

Second, had the words in the uncertainty prime condition increased personal levels of uncertainty or negative affect, we would have expected increased levels of elaboration in this condition (Bless, Bohner, Schwarz, & Strack, 1990; Tiedens & Linton, 2001). However, in the uncertain prime condition, we observed no significant effects of argument quality on attitudes. Interestingly, we did see this relationship with naturally occurring levels of uncertainty. Participants who expressed more uncertainty in themselves exhibited a larger argument quality effect than those who expressed less uncertainty.

Third, in a collateral research program (Tobin & Raymundo, 2006), we found that replacing the other-relevant pronouns with personal pronouns produced different effects. Specifically, when the sentences primed uncertainty in one's own causal understanding, participants were persuaded by causal over non-causal arguments, regardless of their quality. When the sentences primed confidence in one's own causal understanding, however, there were no significant effects of argument

type or quality on attitudes. These findings are different from those observed in the current study, where uncertainty in other people's causal understanding led to no effects of argument type or quality, and confidence led to careful thought about causal arguments. Thus, altering the pronouns in the priming task did seem to alter the target of uncertainty.

GENERAL DISCUSSION

In two studies, we found that people thought carefully about causal arguments when they were attributed to a content-area expert who was thought to understand the causes of events. Increased elaboration was indicated by greater persuasion by strong compared to weak causal arguments. This type of central route or systematic processing is desirable whenever attitudes need to persist over time and resist future attacks (Chaiken, 1987; Petty & Cacioppo, 1986). Furthermore, the causal arguments would have provided participants with causal accounts, which could continue to imply the existence of the stated associations even in the face of disconfirming evidence (Anderson et al., 1980). Thus, when causal arguments are carefully processed, resulting attitudes and beliefs might be particularly resistant to subsequent challenges.

We should note that our findings are consistent with past research which has found that source expertise can increase message elaboration (Heesacker et al., 1983; Moore et al., 1986). It seems that when the motivation to process a message is neither particularly high nor low, perceivers expend their cognitive resources strategically. They think carefully about a message only when it seems likely that the source possesses the necessary level of expertise to deliver valid arguments. Our findings indicate that when deciding if they should process causal arguments, perceivers consider the source's expertise in the specific content area, as well as his probable level of causal understanding. Furthermore, explicit information about the source's causal expertise (Study 1) and implicit perceptions of other people's causal understanding (Study 2) produced similar effects.

ALTERNATIVE OUTCOMES AND PROCESSES

Readers may wonder why participants did not rely on source expertise as a heuristic. When causal arguments were presented and the source possessed both content-area and causal expertise, we think that participants wanted to learn the reasons for the stated associations. Such an understanding would help them to better predict and control their outcomes in life. This is not to say that causal expertise could never serve as a cue. Causal expertise may affect attitudes through the peripheral route when people are unable to engage in elaborative processing due to competing cognitive demands or overly complex causal explanations. This would result in little distinction between strong and weak causal arguments, but greater persuasion when the source was high compared to low in causal and content-area expertise.

In the non-causal condition, it would not have been surprising if content-area expertise had served as a heuristic cue. However, it is also possible that a lack of motivation simply resulted in inertia (i.e., persistence of initial attitudes; Chaiken, Giner-Sorolla, & Chen, 1996).

Last, although we have argued that accuracy motivation prompted the increased processing we observed when causal arguments were presented by a source high in content-area and causal expertise, some may wonder whether defensive processing may provide a better account. Giner-Sorolla and Chaiken (1997) defined defense motivation as "the desire to hold attitudes and beliefs that are congruent with one's perceived material interests or one's current self-defining attitudes and beliefs" (p. 85). They found that participants were more likely to engage in systematic but biased processing when heuristic cues were inconsistent with their vested interests (i.e., participants who performed better on multiple choice exams learned that most students favored a move to all-essay exams in upper-level classes). Unable to defend their vested interests based on cues alone, participants devoted more attention to a set of comments from other students that contained arguments for and against the proposal.

In our studies, participants may have been somewhat threatened to learn that an expert opposed a policy that they thought would bring them benefits (e.g., relaxation, fun, or more time to work). In order to defend their existing attitudes and perceived material interests, they may have tried to counterargue the expert's message only to fail somewhat in the strong causal argument condition. The reason for not processing as much in the other conditions would be that participants were able to defend their attitudes and interests based on simple cues (e.g., people with low expertise are often wrong).

We favor accuracy over defense motivation for three reasons. First, in Study 2, we doubt that the causal confidence prime would have had the observed effect if defense motivation were operating. Because causal confidence was primed in an ostensibly separate study, it seems unlikely that participants would have identified it as a legitimate discounting cue (e.g., "I have a feeling he does not understand why events occur"). Additionally, argument type should not have mattered if participants were simply detecting negative cues. The logical prediction for defense motivated perceivers would have been a Content Area Expertise X Argument Quality interaction such that argument quality mattered more in the high compared to low content-area expertise condition. However, this was not what we observed.

Second, we think that scrutinizing the causal arguments in the high causal confidence prime/high content-area expertise condition would have been an unattractive option for defense-motivated participants. Such a well qualified source could easily craft arguments that would be difficult to counterargue. Other strategies such as defensive inattention (Chaiken et al., 1996) may have been preferable. In contrast, participants in Giner-Sorolla and Chaiken's (1997) study knew the message would contain some support for their existing beliefs and that the arguments were generated by fellow students.

Third, additional analyses revealed that our predicted effects held even among those with the lowest levels of self-investment: seniors, who would be unlikely to benefit from any change. Participants had reported their academic classification in

Studies 1 (27% seniors) and 2 (66% seniors). Initial analyses revealed that academic status did not moderate our predicted effects. When we limited our samples to seniors and repeated our main analyses, the predicted interactions were significant in Studies 1, $F(1, 22) = 6.20$, $p < .05$, and 2, $F(1, 100) = 3.85$, $p = .05$. Furthermore, the critical comparisons between strong and weak causal arguments in the high causal expertise condition in Study 1, $t(22) = 1.83$, $p < .05$, and in the high causal confidence prime/high content area expertise condition in Study 2, $t(27) = 2.88$, $p < .01$, also were significant. Given that even participants who would not be personally affected by the issue showed the predicted effect, it seems unlikely that defense of material interests played much of a role.

CONCLUSIONS

The current set of findings extend existing knowledge about the effectiveness of causal arguments in persuasive communication. Initial research on causal arguments demonstrated a main effect: causal arguments can be more effective than non-causal arguments for changing beliefs (Slusher & Anderson, 1996). Together, recent research (Tobin & Weary, 2008) and the current findings demonstrate the existence of two sets of moderating variables: (1) personal levels of causal uncertainty and causal importance, and (2) the source's level of perceived causal and content-area expertise. In light of these findings, it seems possible that the success of causal over non-causal arguments in Slusher and Anderson's studies may have been due in part to participants' doubts about how viruses are transmitted or the expertise of their source (i.e., an epidemiologist with the Center for Disease Control).

Causal arguments may be utilized by educators, social scientists, or advertisers, as long as they are able to explain the underlying causal mechanism behind some event. In order to increase an audience's motivation to attend to their causal arguments, they could try to instill doubts in the audience's existing level of causal understanding and emphasize the importance of causal understanding (Tobin & Weary, 2008). Alternatively, they could highlight the source's causal and content-area expertise, as we demonstrated in the current set of studies. Future research will undoubtedly reveal other potential moderators, as well as factors that can lead to a cue-based acceptance of causal over non-causal arguments. For now, however, the available literature points to the potential value of causal arguments in producing a lasting change in attitudes and beliefs.

APPENDIX

Sentences used in the scrambled sentence task (unscrambled).

High Causal Confidence
He *understands* their behavior. cause
She listened to them. *confident*
They found it *clear*. why
He often feels *knowledgeable*. performance
They *knew* her motives. interact
Her friends didn't call. *sure*
Her success impresses them. *definite*
He read her letter. *comprehend*
She *expected* her grade. jeans
He praised their work. *certain*
Low Causal Confidence
Their behavior *puzzles* him. cause
She listened to them. *confusing*
They found it *unclear*. why
He often feels *perplexed*. performance
They *doubt* her motives. interact
Her friends didn't call. *unsure*
Her success impresses them. *bewildering*
He read her letter. *misunderstand*
Her grade was *unexpected*. jeans
He praised their work. *uncertain*
Filler
I ate my lunch. magazine
She looks very fit. sidewalk
He took the container. noise
My friend went home. example
I washed the car. transfer
The room is empty. baton
The pen is mine. rotate
She's on a ledge. surf
The light came on. envelope
He folded the paper. runner

REFERENCES

Anderson, C. A., Lepper, M. R., & Ross, L. (1980). Perseverance of social theories: The role of explanation in the persistence of discredited information. *Journal of Personality and Social Psychology, 39,* 1037-1049.

Bargh, J. A., & Chartrand, T. L. (2000). The mind in the middle: A practical guide to priming and automaticity research. In H. Reis & C. Judd (Eds.), *Handbook of research methods in social psychology* (pp. 253-285). New York: Cambridge University Press.

Baron, R. M., & Kenny, D. A. (1986). The moderator-mediator variable distinction in social psychological research: Conceptual, strategic and statistical considerations. *Journal of Personality and Social Psychology, 51,* 1173-1182.

Bless, H., Bohner, G., Schwarz, N., & Strack, F. (1990). Mood and persuasion: A cognitive response analysis. *Personality and Social Psychology Bulletin, 16,* 331-345.

Briñol, P., & Petty, R. E. (2006). Fundamental processes leading to attitude change: Implications for cancer prevention communications. *Journal of Communication, 56,* 81-104.

Cacioppo, J. T., Harkins, S. G., & Petty, R. E. (1981). The nature of attitudes and cognitive responses and their relationships to behavior. In R. E. Petty, T. M. Ostrom, & T. C. Brock (Eds.), *Cognitive responses in persuasion* (pp. 31-54). Hillsdale, NJ: Erlbaum.

Cacioppo, J. T., & Petty, R. E. (1981). Social psychological procedures for cognitive response assessment: The thought listing technique. In T. V. Merluzzi, C. R. Glass, & M. Genest (Eds.), *Cognitive assessment* (pp. 309-342). New York: Guilford.

Chaiken, S. (1987). The heuristic model of persuasion. In M. P. Zanna, J. M. Olson, & C. P. Herman (Eds.), *Social influence: The Ontario symposium* (Vol. 5, pp. 3-30). Hillsdale, NJ: Erlbaum.

Chaiken, S., Giner-Sorolla, R., & Chen, S. (1996). Beyond accuracy: Defense and impression motives in heuristic and systematic information processing. In P. M. Gollwitzer, & J. A. Bargh (Eds.), *The psychology of action: Linking cognition and motivation to behavior* (pp. 553-578). New York: Guilford.

Chaiken, S., Liberman, A., & Eagly, A. H. (1989). Heuristic and systematic information processing within and beyond the persuasion context. In J. S. Uleman & J. A. Bargh (Eds.), *Unintended thought.* New York: Guilford.

Gilbert, D. T. (1998). Ordinary personology. In D. T. Gilbert, S. T. Fiske, & G. Lindzey (Eds.), *The handbook of social psychology* (4th ed., Vol. 2, pp. 89-150). New York: McGraw Hill.

Giner-Sorolla, R., & Chaiken, S. (1997). Selective use of heuristic and systematic processing under defense motivation. *Personality and Social Psychology Bulletin, 23,* 84-97.

Hastie, R., & Pennington, N. (2000). Explanation-based decision making. In T. Connolly, H. R. Arkes, & K. R. Hammond (Eds.), *Judgment and decision making* (2nd ed., pp. 212-228). Cambridge: Cambridge University Press.

Heesacker, M., Petty, R. E., & Cacioppo, J. T. (1983). Field dependence and attitude change: Source credibility can alter persuasion by affecting message-relevant thinking. *Journal of Personality, 51,* 653-666.

Heider, F. (1958). *The psychology of interpersonal relations.* New York: Wiley.

Hilton, D. (2007). Causal explanation: From social perception to knowledge-based causal attribution. In A. W. Kruglanski & E. T. Higgins (Eds.), *Social psychology: Handbook of basic principles* (2nd ed., pp. 232-253). New York: Guilford.

Jalnawala, N., & Wilkin, N. E. (2007). The effect of DTC advertisement content of belief tenacity: A study of appeals and argument types. *Research in Social and Administrative Pharmacy, 3,* 28-46.

Jarvis, W. B. G. (2004). MediaLab Research Software, Version 2004 [Computer Software]. New York, NY (www.empirisoft.com): Empirisoft.

Moore, D. L, Hausknecht, D., & Thamodaran, K. (1986). Time compression, response opportunity, and persuasion. *Journal of Consumer Research, 13,* 85-99.

Muller, D., Judd, C. M., & Yzerbyt, V. Y. (2005). When moderation is mediated and mediation is moderated. *Journal of Personality and Social Psychology, 89,* 852-863.

Pennington, N., & Hastie, R. (1992). Explaining the evidence: Tests of the story model for juror decision making. *Journal of Personality and Social Psychology, 62,* 189-206.

Petty, R. E., & Cacioppo, J. T. (1986). *Communication and persuasion: Central and peripheral routes to attitude change.* New York: Springer-Verlag.

Petty, R. E., Wheeler, S. C., & Bizer, G. Y. (2000). Attitude functions and persuasion: An elaboration likelihood approach to matched versus mismatched messages. In G. R. Maio & J. M. Olson (Eds.), *Why we evaluate: Functions of attitudes* (pp. 133-162). Mahwah, NJ: Erlbaum.

Pratkanis, A. R. (2007). Social influence analysis: An index of tactics. In A. R. Pratkanis (Ed.), *The science of social influence: Advances and future progress* (pp. 17-82). New York: Psychology Press.

Slusher, M. P., & Anderson, C. A. (1996). Using causal persuasive arguments to change beliefs and teach new information: The mediating role of explanation availability and evaluation bias in the acceptance

of knowledge. *Journal of Educational Psychology, 88,* 110-122.

Sobel, M. E. (1982). Asymptotic intervals for indirect effects in structural equations models. In S. Leinhart (Ed.), *Sociological Methodology 1982* (pp. 290-312). San Francisco: Jossey-Bass.

Tiedens, L. Z., & Linton, S. (2001). Judgment under emotional certainty and uncertainty: The effects of specific emotions on information processing. *Journal of Personality and Social Psychology, 81*, 973-988.

Tobin, S. J., & Raymundo, M. M. (2006, January). *The use of causal explanations in persuasion: Effects of self-uncertainty and other-certainty.* Poster presented at the annual meeting of the Society for Personality and Social Psychology, Palm Springs, CA.

Tobin, S. J., & Weary, G. (2008). The effects of causal uncertainty, causal importance, and initial attitude on attention to causal persuasive arguments. *Social Cognition, 26,* 44-65.

Vaughn, L. A., & Weary, G. (2003). Causal uncertainty and correction of judgments. *Journal of Experimental Social Psychology, 39,* 516-524.

Weary, G., & Edwards, J. A. (1994). Individual differences in causal uncertainty. *Journal of Personality and Social Psychology, 67*, 308-318.

Weary, G., & Edwards, J. A. (1996). Causal uncertainty and related goal structures. In R. M. Sorrentino and E. T. Higgins (Eds.), *The handbook of motivation and cognition (Vol. 3): The interpersonal context.* (pp. 148-181). New York: Guilford.

Weary, G., Jacobson, J. A., Edwards, J. A., & Tobin, S. J. (2001). Chronic and temporarily activated causal uncertainty beliefs and stereotype usage. *Journal of Personality and Social Psychology, 81*, 206-219.

Weary, G., Tobin, S. J., & Edwards, J. E. (in press). Causal uncertainty. To appear in R. M. Arkin, K. C. Oleson, & P. J. Carroll (Eds.), The uncertain self: A handbook of perspectives from social and personality psychology. Mahwah, NJ: Erlbaum.

Wichman, A. L., Brunner, R. P., & Weary, G. (2008). Immediate and delayed effects of causal uncertainty inductions on uncertainty accessibility. *Journal of Experimental Social Psychology, 44,* 1106-1113.