

## EVIDENCE THAT UNCONSCIOUS THINKING INFLUENCES PERSUASION BASED ON ARGUMENT QUALITY

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Growing evidence demonstrates that individuals can think about complex information unconsciously while conscious processes cannot due to distraction. Further, unconscious processes can consider information that is difficult for conscious processes to access, such as rapidly presented information. The hypothesis that individuals can think about rapidly presented persuasive information and form attitudes based on that information to a greater extent when they think unconsciously versus consciously or when both conscious and unconscious thinking are limited was tested. All experimental participants listened to a quickly presented persuasive message containing either strong or weak arguments, and then reported their message attitudes (1) immediately, (2) after 3 min of conscious thought, or (3) after 3 min of distraction (unconscious thought). As predicted, only participants in the unconscious-thought conditions reported more favorable attitudes in response to strong versus weak arguments. These results support the existence of unconscious thought, and implications for this literature and persuasion models are discussed.

In the mid-1980s, a series of advertisements was broadcast on U.S. television in which a man spoke incredibly fast about very small toys. Viewers of these advertisements could just comprehend that the toys were detailed, small, and collectible, a simple message that likely promoted favorable toy-attitudes. However, fast

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Ian Handley's preparation of this manuscript was supported by grants (P20 RR16455-09 and P20 RR16455-10) from the National Center for Research Resources (NCRR), a component of the National Institutes of Health (NIH), and its contents are solely the responsibility of the authors and do not necessarily represent the official view of NCRR or NIH. We thank Jenine Kirschenbaum-Handley for her feedback on an earlier draft of this paper, Laura Cichosz and Jarrett Twamley for their assistance coding data, and C. Mark Sollars and research assistants in the Persuasion and Affect Laboratory at Montana State University for their help collecting data.

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messages that present complex information are difficult to think about consciously, and tend not to influence attitudes (e.g., Smith & Shaffer, 1995). Yet, stimuli that are difficult or impossible for conscious processes to consider can be considered by unconscious processes (e.g., Dijksterhuis, 2010; Wegner & Bargh, 1998). Further, research supporting Unconscious Thought Theory (UTT; Dijksterhuis & Nordgren, 2006) indicates that individuals can think about complex information unconsciously (i.e., without attention), and output sound judgments. Thus, there may be situations in which persuasive information is difficult or impossible for conscious thought to process, yet persuasion can still occur from unconscious considerations of that information. We tested for this possibility by following paradigms common in the unconscious-thought and persuasion literatures (e.g., Dijksterhuis, 2004; Petty & Cacioppo, 1986a).

### A BRIEF OVERVIEW OF DUAL-PROCESS MODELS OF PERSUASION

For about 30 years, dual-process models such as the Elaboration Likelihood Model (ELM; e.g., Petty & Cacioppo, 1981, 1986a; Petty & Wegener, 1998) and the Heuristic Systematic Model (HSM; e.g., Chaiken, 1980, 1987) have dominated persuasion research. Both models suggest that attitude change and formation can occur through predominantly effortful or less effortful means. When individuals are motivated and able to exert mental effort and think about a persuasive message, they attend to and elaborate upon the merits of message arguments. Thus, individuals generate a higher proportion of positive thoughts and more favorable attitudes in response to messages containing strong versus weak arguments. This effect of argument quality on attitudes is taken as evidence that individuals' attitudes result from effortful considerations of message arguments (e.g., Petty & Cacioppo, 1986a; Petty & Wegener, 1998). As described, such effortful means to persuasion are clearly dominated by conscious thinking processes. Alternatively, when individuals are not motivated or able to carefully think about a persuasive message, their attitudes are not heavily influenced by the quality of message arguments but by heuristics or message-tangential cues (e.g., message-author expertise; Petty, Cacioppo, & Goldman, 1981) that require little effort to use.

For example, Smith and Shaffer (1995) created an auditory persuasive message containing either strong or weak arguments supporting a topic that research participants were motivated to consider. Depending on random assignment, one of these messages was presented to each participant at a conversational or rapid (about 220 words per minute) speed. Importantly, participants reported more favorable attitudes about the topic if the message contained strong versus weak arguments, but only when the message was played at conversational speeds. Evidently, participants could consciously think about the message to a much lesser extent when it was presented at a rapid versus conversational speed.

### CAN MESSAGES BE PROCESSED UNCONSCIOUSLY?

Yet, perhaps rapidly presented messages can sometimes influence individuals' attitudes through less effortful, unconscious, means. After all, unconscious processes often can use information that is difficult or unavailable for use by con-

scious processes. For instance, simple stimuli that are presented subliminally or are not focal to conscious processes can influence individuals' attitudes or attitude accessibility (e.g., Albarracín & Handley, 2011; Cooper & Cooper, 2002; Karremans, Stroebe, & Claus, 2006; Monahan, Murphy, & Zajonc, 2000), goals (e.g., Albarracín et al., 2008; Bargh, Gollwitzer, Lee-Chai, Barndollar, & Troetschel, 2001), and judgments (e.g., Dijksterhuis, 2010; Wegner & Bargh, 1998) via unconscious processes. Furthermore, Dijksterhuis (2004) and colleagues (e.g., Dijksterhuis, Bos, Nordgren, & Van Baaren, 2006) suggest that individuals can actually engage in unconscious thought—or task-directed mental activity of which individuals are unaware—to produce information-based judgments. They argue that unconscious processing capacity is vast whereas conscious processing capacity is limited. As such, individuals should often form better information-based judgments following a period of unconscious thought relative to conscious thought or when both unconscious and conscious thought are hindered. Numerous findings consistent with this hypothesis have been dubbed the deliberation-without-attention (DWA) effect. Overall, the literature on unconscious processes backs the idea that individuals may sometimes form attitudes based on message arguments, even when those arguments are presented too quickly for thorough conscious thinking (Smith & Shaffer, 1995).

#### UNCONSCIOUS THOUGHT: EVIDENCE AND IMPLICATIONS FOR PERSUASION

Experiments testing the DWA hypothesis commonly follow a paradigm established by Dijksterhuis (2004). For example, Dijksterhuis asked participants in two separate experiments to form an impression of upcoming information. He then provided in random order 12 pieces of information (4 s each) about each of four apartments. Importantly, one apartment was the best (possessing eight positive and four negative attributes), one was the worst (possessing four positive and eight negative attributes), and two possessed equal numbers of positive and negative attributes. Following this information, participants were randomly assigned to (1) immediately judge the apartments (allowing negligible conscious and unconscious thinking), (2) think for 3 min then judge the apartments (i.e., think consciously), or (3) engage in a distraction task for 3 min then judge the apartments (preventing conscious thinking, but allowing unconscious thinking). With some minor qualifications, participants in the distraction condition reported more liking for (Experiment 1), or were more likely to indicate a preference for (Experiment 2), the best (vs. worst) apartment relative to the immediate-judgment or conscious-thought conditions.

Importantly, several findings in the unconscious-thought literature support the possibility that individuals can also unconsciously think about persuasive information. First, in additional experiments, Dijksterhuis (2004) demonstrated that participants form more polarized judgments of valenced objects and cluster information in memory to a greater extent following a period of unconscious versus conscious thought. Thus, individuals might also form more polarized attitudes from strong versus weak arguments following a period of unconscious thought. Second, Dijksterhuis et al. (2006) demonstrated that participants render better judgments from complex (but not simple) information following periods of unconscious versus conscious thought. Importantly, complex messages are commonly used in persua-

sion research, meaning individuals may process these messages thoroughly if they think unconsciously.

Third, Bos, Dijksterhuis, and Van Baaren (2011) demonstrated that unconscious thought can weight attributes by importance (at least in familiar consumer contexts that do not require rule-based judgments, *cf.* Payne, Samper, Bettman, & Luce, 2008). Notably, the quality of persuasive arguments sometimes depends on the importance of the suggested outcomes. For example, a strong argument for the implementation of “senior comprehensive exams” might suggest that the exams will result in an *important* positive outcome (e.g., increased acceptance rates at graduate or professional schools), whereas a weak argument might suggest a relatively *unimportant* positive outcome (e.g., impressing high school students by keeping current with new trends). Thus, following a period of unconscious thinking, individuals could form more favorable attitudes in response to strong (vs. weak) arguments that present important (vs. unimportant) positive outcomes. Of course, strong and weak persuasive arguments can vary on other dimensions as well, an issue addressed in the General Discussion.

Finally, message-based persuasion resulting from unconscious thought is likely dependent on motivational factors. Specifically, Bos, Dijksterhuis, and Van Baaren (2008) found that individuals tend to think unconsciously only when they hold a goal to form an impression of upcoming information. In a persuasion context, individuals are likely to spontaneously activate a goal to consider message information and think unconsciously when that information is personally relevant or important. Thus, the current research created a context in which the topic of a persuasive message was personally relevant to participants.

## THE CURRENT RESEARCH

### OVERVIEW, HYPOTHESES, AND OBJECTIVES

In the current experiment, undergraduate participants learned that senior comprehensive exams might be implemented at their university the following year. Participants were then randomly assigned to listen to a message containing either strong or weak arguments supporting the exams. These messages were played rapidly (220 words per minute) for all participants, allowing for message comprehension but likely inhibiting conscious thought while the message was played (Smith & Shaffer, 1995). Next, participants were randomly assigned to one of three conditions, following the procedures of Dijksterhuis (2004): (1) some participants immediately reported their attitudes about the exams, (2) some were provided 3 min to think about the message and then reported their attitudes (conscious-thought condition), and (3) some were distracted for 3 min and then reported their attitudes (unconscious-thought condition). Participants also completed several exploratory measures.

Because the message was presented rapidly, participants’ ability to consciously think about the message should have been severely compromised while or after it was presented. As a result, participants who immediately reported their attitudes (engaged in minimal conscious or unconscious thought) or were given time to consciously think about the message should form comparable attitudes in response to messages containing strong and weak arguments. This prediction follows directly

from the findings of Smith and Shaffer (1995). However, given evidence indicates that individuals can think unconsciously and unconscious processes can often use information that is less available to conscious processes, participants who were distracted following the message were predicted to form more favorable attitudes after hearing strong versus weak arguments. Such a finding would indicate that, at least under some circumstances, individuals can form attitudes based on argument quality even when they are prevented from conscious and effortful message-processing.

## METHOD

### Participants and Design

One hundred forty-four introductory psychology students (62.5% female) at Montana State University (MSU) received partial course credit for their participation in the experiment. Participants were randomly assigned via computer to the conditions of a 3 (thought condition: immediate vs. conscious vs. unconscious) by 2 (argument quality: strong vs. weak) between-subjects design.

### Procedure

After providing informed consent, participants began the experiment which was conducted on computers equipped with headphones. Participants learned that they were about to listen to an audio message about senior comprehensive exams that might be implemented at Montana State University in the next year. Participants should have been motivated to understand the message given that the exams could affect them. Further, participants were told to evaluate the quality of the audio recording, and that the experiment was testing which of several audio recordings was best for use on campus radio.

Next, participants were randomly assigned to hear an audio recording that presented strong or weak arguments in favor of the exams. Both messages were read by the same narrator and recorded as a computer file. Computer software sped up the recordings so that they were presented at 220 words per minute without changing the pitch or tone of the narrator's voice. Smith and Shaffer (1995) demonstrated that speech presented at 220 words per minute is fast enough to interfere with individuals' ability to consciously elaborate upon message content, but allows for message comprehension. After hearing the message, participants were randomly assigned to either immediately report their attitudes about senior comprehensive exams, think about the message they just heard for 3 min and then report their attitudes, or engage in a distraction task for 3 min and then report their attitudes. Participants also completed thought and exploratory measures, then were thanked and dismissed.

### Independent Variables

*Argument Quality.* Via random assignment, participants heard a message containing either strong or weak arguments supporting the implementation of senior comprehensive exams at Montana State University. Each message contained ap-

proximately 600 words and explained that Montana State University was considering implementing senior comprehensive exams which all students must pass in order to graduate. Previous research (e.g., Albarracín & Wyer, 2001; Petty & Cacioppo, 1986b) using these messages confirmed that the strong arguments were viewed as more compelling and engendered more favorable attitudes about senior comprehensive exams than the weak arguments.

*Thought Condition.* Participants were randomly assigned to one of three thought conditions after hearing a persuasive message. Participants in the immediate condition reported their attitudes toward senior comprehensive exams and other dependent measures immediately after hearing a message. Participants in the conscious-thought condition read "You will now be given 3 minutes in which you should very carefully think about Senior Comprehensive Exams" and further detailed instructions. The computer then presented a blank screen for 3 min, during which time participants could think consciously about the message they just heard. After the time had elapsed, the screen switched and presented participants with attitude and other dependent measures to complete. Participants in the unconscious-thought condition received instructions for, and completed, a distracting *n*-back task (Jonides et al., 1997) that lasted 3 min. Specifically, the 2-back task was used in which a sequence of numbers was presented one at a time, and participants were required to indicate every time the currently presented number was presented two numbers previously (e.g., ...3...4...3). Every time this occurred, participants were instructed to press the computer spacebar. This task occupies working memory and prevents individuals from consciously thinking about the message they just heard (see, e.g., Dijksterhuis, 2004).

## DEPENDENT VARIABLES

*Attitudes.* Participants completed the following 11 attitude items using 9-point scales: "To what extent was the comprehensive exam article convincing?" (1 = *not at all* to 9 = *very much*); "The arguments presented within the recording were:" (1 = *weak* to 9 = *strong*); "To what extent do you agree or disagree that comprehensive exams should be implemented at MSU?" (1 = *not at all* to 9 = *agree completely*); "Comprehensive exams are:" (1 = *unacceptable* to 9 = *acceptable*); "To what extent do you think that it is a good idea to require students to pass comprehensive exams before they are granted their degree?" (1 = *not at all* to 9 = *very much*); "When it comes to comprehensive exams, I am..." (1 = *completely opposed* to 9 = *completely in favor*); and five items completing the stem "The position discussed within the recording is:" (1 = *harmful, bad, foolish, unfavorable, negative* to 9 = *beneficial, good, wise, favorable, positive*). Participants' responses to these 11 items were averaged to create an attitude index with very high internal consistency (Cronbach's  $\alpha = .912$ ).

*Message Relevance and Processing Effort.* Participants completed a measure of personal relevance by responding on a 9-point scale to the item "I feel the issue of comprehensive exams is..." (1 = *irrelevant to me* to 9 = *relevant to me*), that was interspersed with the attitude measures. Toward the end of the experiment, participants also completed items measuring effort by responding on a 9-point scale to the questions "Did you think deeply about the information contained in this message," "How much were you able to concentrate on the comprehensive exam article you heard" (1 = *not at all* to 9 = *very*), and "How much effort do you feel

you put into understanding what the essay had to say?" (1 = *very little effort* to 9 = *a lot of effort*). These three items were averaged to create an effort index with good internal consistency (Cronbach's  $\alpha = .753$ ).

*Message Thoughts and Argument Recall.* After reporting their attitudes, participants were asked to "Please write down all of the thoughts that went through your mind as you listened to the article about the comprehensive exams" and received further clarification instructions. Participants were provided 10 separate text boxes into which they could type their thoughts. These thoughts were coded by two research assistants as either being positive (i.e., supportive of the message), neutral, or negative (unsupportive of the message). Further, the coders determined whether or not the thoughts pertained to the message. Inconsistencies between the coders were resolved through discussion (pre-discussion agreement in the total number of positive, neutral, and negative thoughts was high, all greater than 95%), and only message-related thoughts were analyzed. A proportion-of-positive-thought measure was created by subtracting the number of negative thoughts from the number of positive thoughts, and dividing by the total number of thoughts. Additionally, a total-thought measure was created by summing the number of all message thoughts.

Participants were also asked to write down all the arguments they could remember from the persuasive message, and were provided 10 separate text boxes into which they could type recalled arguments. Two research assistants who were highly familiar with both the strong and weak versions of the persuasive message coded participants' recall for accuracy, and tallied the number of correctly recalled arguments. The coders strongly agreed on the number of arguments correctly recalled by participants ( $r = .90, p < .001$ ), and inconsistencies were resolved by discussion. The agreed upon number of correctly recalled arguments served as the measure of message recall.

*Author Impressions.* Assessments of argument quality could influence participants' impression of the message author. That is, the more favorable participants are toward the message the more favorable may be their impressions of the message author. To investigate this possibility, participants were asked to respond on 9-point scales to five items assessing their impression of the message author: "How much would you say you like the author of the essay?" (1 = *not at all* to 9 = *extremely*), "How honest do you feel the person who wrote the essay is?" (1 = *very dishonest* to 9 = *very honest*), "How knowledgeable is the person who wrote the essay?" (1 = *very unknowledgeable* to 9 = *very knowledgeable*), "How objective is the person who wrote the essay?" (1 = *very unobjective* to 9 = *very objective*), "How believable is the person who wrote the essay?" (1 = *not at all believable* to 9 = *very believable*). Responses to these items were averaged to create an author-impression index with good internal consistency (Cronbach's  $\alpha = .787$ ).

## RESULTS

Each dependent measure was independently analyzed using a 3 (thought condition) by 2 (argument quality) between-subjects analysis of variance (ANOVA) and planned comparisons of predicted mean differences for the primary attitude variable.

TABLE 1. Attitude Means, Standard Deviations, and Sample Size by Condition

Message Arguments	Thought Condition		
	Immediate	Conscious	Unconscious
Strong	6.16 (1.23), $n = 20$	6.00 (1.29), $n = 25$	6.62* (0.93), $n = 27$
Weak	5.74 (1.66), $n = 33$	5.75 (1.23), $n = 20$	5.44* (1.38), $n = 18$

Note. Standard deviations are in parentheses. Means with \* are significantly different at  $p < .05$ .

### Attitudes

Analysis of the attitude index revealed no main effect of thought condition,  $F < 1$ , but did reveal a significant main effect of argument quality such that participants reported more favorable attitudes about senior comprehensive exams if they heard strong ( $M = 6.29$ ,  $SD = 1.13$ ) versus weak arguments ( $M = 5.67$ ,  $SD = 1.47$ ),  $F(1, 138) = 7.51$ ,  $p < .01$ ,  $\eta_p^2 = .052$ . The overall interaction between thought condition and argument quality was not significant,  $F(2, 138) = 1.54$ ,  $p > .05$ . However, the specifically predicted interaction pattern was tested using planned comparisons following the guidelines of Rosenthal and Rosnow (1985). In the first planned comparison, participants in the unconscious-thought condition received a weight of 1 or -1 if they heard the strong or weak message, respectively (other conditions received a weight of 0). As predicted, this comparison revealed that participants in the unconscious-thought conditions reported more favorable attitudes if they heard strong versus weak arguments,  $t(138) = 2.93$ ,  $p < .01$ ,  $\eta_p^2 = .058$  (see Table 1 for means and standard deviations). However, similar contrast testing for argument quality effects in the immediate and conscious-thought conditions were not significant, both  $ts < 1.12$ ,  $ps > .26$ . Overall, the significant main effect of argument quality was primarily driven by the difference observed within the unconscious-thought condition.

### Relevance and Processing Effort

The ANOVA revealed no significant effects for the relevance measure, all  $Fs < 2.29$  and  $ps > .10$ . Overall, participants rated the message as more personally relevant than the scale midpoint of 5 ( $Grand M = 6.73$ ),  $t(143) = 9.69$ ,  $p < .001$ . For the effort measure, there was only a significant main effect of argument quality,  $F(1, 138) = 6.71$ ,  $p = .01$ ,  $\eta_p^2 = .046$ , such that participants reported more effort when exposed to weak versus strong arguments (all other  $Fs < 1.85$ ,  $ps > .16$ ). This result might indicate that weak arguments were unexpected or attention grabbing, thus evoking more processing relative to stronger arguments. Overall, participants reported exerting significantly more effort than the scale midpoint of 5 ( $Grand M = 5.82$ ),  $t(143) = 6.21$ ,  $p < .01$ . Interestingly, although the interaction was not significant, the main effect of argument quality was primarily driven by the immediate and conscious-thought conditions; in the unconscious-thought condition, participants reported very comparable levels of effort when they heard weak and strong arguments ( $Ms = 6.13$  vs.  $6.04$ , respectively).

### Thoughts and Recall

The analysis of the proportion-of-positive-thought measure only revealed a main effect of argument quality,  $F(1, 138) = 8.81, p < .01, \eta_p^2 = .061$  (all other  $F$ s  $< 1.16, ps > .316$ ), such that participants generated a higher proportion of positive thoughts if they heard the message containing strong ( $M = 0.132; SD = 0.383$ ) as opposed to weak ( $M = -0.128; SD = 0.599$ ) arguments. Further, the analysis of the total number of thoughts yielded no significant effects, all  $F$ s  $< 3.31, ps > .07$ , indicating all conditions generated comparable numbers of message thoughts. Finally, the analysis of the recall measure only revealed a main effect of argument quality,  $F(1, 138) = 8.45, p < .01, \eta_p^2 = .058$  (all other  $F$ s  $< 1.23, ps > .297$ ), such that participants recalled more arguments if they heard the message containing weak ( $M = 4.17; SD = 2.03$ ) as opposed to strong ( $M = 3.24; SD = 2.06$ ) arguments. This mirrors results for the effort measure, and might result from the salience of weak arguments.

The meaning of the proportion-of-positive-thought measure is ambiguous in this experiment for several reasons, but was reported given it is a common dependent variable in persuasion experiments. First, the main effect of argument quality on this thought measure may have reflected thoughts generated *after* prompting, particularly given attitudes were unaffected by argument quality in the immediate and conscious-thought conditions. Second, as discussed by Albarracín (2002), many message-related thoughts arguably do not reflect elaboration of the message, but rather reflect participants' attitudes about the message. For example, some current participants stated "comprehensive exams are a bad idea" and "I agree completely with the idea of comprehensive exams," likely reflecting *attitudes* about the message. Therefore, the effect of argument quality on this thought measure might to some degree reflect verbally-reported attitudes. Finally, the effect of argument quality on the thought measure may seem to indicate that participants in the unconscious-thought condition were thinking consciously about the message while it was presented (but see above arguments). However, research by Dijksterhuis and Meurs (2006) demonstrated that unconscious thought can result in conscious outputs. Thus, participants in the unconscious-thought condition of the current experiment may have thought about the message unconsciously, yet were able to access these thoughts later when asked. Overall, the thought measure does not clarify how individuals processed the persuasive message. Rather, the methods employed by the experiment are used to interpret the way by which attitudes were created.

### Author Impressions

The analysis of the author-impression measure revealed no significant main effect of thought condition,  $F = 2.25, p > .10$ , but did reveal a significant main effect of argument quality,  $F(1, 138) = 7.17, p < .01, \eta_p^2 = .049$ . Specifically, participants reported more favorable impressions of the author if they heard strong ( $M = 6.20; SD = 0.99$ ) versus weak ( $M = 5.75; SD = 1.37$ ) arguments in the message. Further, the interaction between thought and argument quality was significant,  $F(2, 138) = 4.22, p < .05, \eta_p^2 = .058$ . Simple-effects tests revealed that the interaction pattern was the same as that observed for the attitude measure. Specifically, in the unconscious-thought condition, participants reported significantly more favorable impressions

of the author if they heard strong ( $M = 6.30$ ;  $SD = 0.74$ ) versus weak ( $M = 4.99$ ;  $SD = 1.25$ ) arguments,  $F(1, 138) = 13.40$ ,  $p < .001$ ,  $\eta_p^2 = .089$ , whereas this difference was not observed in either the immediate or conscious-thought conditions, both  $F_s < 1.64$ ,  $p_s > .20$ . Finally, the author-impression measure correlated significantly with the attitude measure ( $r = .62$ ,  $p < .01$ ), likely indicating that participants' impression of the author was based on message attitudes. Thus, the results of the author-impression measure seem to corroborate those for the attitude measure.

## GENERAL DISCUSSION

The persuasion literature (see Albarracín, Johnson, & Zanna, 2005; Albarracín & Vargas, 2010; Petty & Wegener, 1998) consistently demonstrates that when individuals are motivated and able to think carefully about a message, they form more favorable attitudes in response to messages containing strong versus weak arguments. Further, without this motivation or ability, attitudes are generally not influenced by the quality of message arguments. In the current experiment, participants were likely motivated to process the message given they reported that the message was personally relevant. Yet, because the message was presented rapidly, participants' ability to consciously consider argument quality was hindered during or after the message presentation. As evidence, argument quality did not impact participants' attitudes in the conscious-thought and immediate conditions (consistent with Smith & Shaffer, 1995). Of key importance, however, individuals in the unconscious-thought condition did form more favorable attitudes in response to messages containing strong versus weak arguments. That is, participants based attitudes on argument quality only when they were prevented from thinking consciously following the message, but had time to think unconsciously. These results demonstrate that individuals can unconsciously process a complex persuasive message that is difficult to process consciously, provided just a little time and conscious distraction following the message. These conclusions were supported by planned comparisons, although the interaction between argument quality and thought condition was not statistically significant.

These results are highly inconsistent with the ELM and HSM, given both models suggest that effortful (not less effortful) thought tends to produce attitudes based on argument quality. Yet, persuasion models could encompass the reported findings if they instead emphasized individuals' ability to process persuasive information *regardless of effort*. A modified version of these models could propose that when individuals are able to process a persuasive message consciously (with effort) or unconsciously (with little effort), attitudes are likely based on argument quality. More specifically, when individuals can think consciously about a message, or when individuals have time to think unconsciously about a message while conscious processes are distracted, attitudes will likely be message based. However, when individuals' ability to process a message consciously or unconsciously is reduced (e.g., by distraction or short time limitations, respectively), attitudes will likely result from non-message factors such as tangential cues and heuristics. This modification preserves the ELM/HSM idea that an ability to think results in message-based attitudes, but adds the recognition that individuals can sometimes think about persuasive messages unconsciously.

The current research also has implications for theorizing on unconscious thought and the DWA effect. First, in all experiments demonstrating the DWA effect (of which we are aware), information was made fairly accessible to conscious processes. For example, Dijksterhuis (2004) presented each piece of information for 4 seconds, allowing for conscious understanding of the information. However, this information was randomly ordered and voluminous, making it difficult for conscious thinking to later use in making judgments. Yet, the persuasive information in the current experiment was clearly difficult for conscious thinking to access while it was received (and after). As evidence, participants in the immediate and conscious-thought conditions did not base their attitudes on argument quality even though they were likely motivated to process the message. However, participants in the unconscious-thought conditions did base their attitudes on argument quality. At the very least, this highlights that unconscious thinking can use consciously presented information that is very difficult for conscious processes to access (i.e., unconscious thinking can consider a broader range of information). Even more, this finding reveals the *possibility* that information that is available only to unconscious processes—such as complex subliminal information or information that is otherwise too degraded for conscious processes to understand—could be fodder for unconscious thought and influence resultant judgments.

Second, whereas prior research demonstrates that individuals can think unconsciously about the valance, amount, and importance of information, the current research may reveal that unconscious thought can consider additional informational dimensions. In the current experiment, one persuasive message contained arguments that were probably more rational (and thus were stronger) than others. Further, some arguments touted outcomes that were probably more likely (and thus were stronger; e.g., Fishbein & Ajzen, 1975) than others. Although the experiment was not designed to specifically test the relative contribution of these other dimensions to participants' judgments, the results hint that unconscious thought may be able to incorporate a variety of informational dimensions in making judgments. This possibility certainly warrants future consideration and exploration.

Finally, participants in this current experiment were not explicitly directed to form an impression of the persuasive information (cf., for example, Dijksterhuis, 2004). Rather, they were merely told that the topic in the message may influence them. Yet, it appears participants spontaneously activated a goal to process the persuasive message, as they reported the message was personally relevant and that they put effort into understanding the message. Further, given the result for the unconscious-thought condition, this spontaneously activated goal was sufficient to engender unconscious thought about the message. Thus, in addition to explicit processing goals, spontaneous self-generated goals, and likely subtly activated goals, seem sufficient to trigger unconscious considerations of information.

## LIMITATIONS

There are some limitations to the current research. First, this paper reports one experiment. Clearly, other researchers should replicate these results before one alters dual-process models of persuasion to acknowledge that attitudes can be in-

fluenced by unconscious considerations of argument quality. However, the procedures and materials used in the reported experiment were borrowed directly from previously published research. Specifically, previous experiments have verified that the messages currently used result in more or less favorable attitudes and the messages were presented at speeds that were difficult for conscious thinking to use. Further, the attitude measures employed are commonplace in the persuasion literature, and the experiment followed Dijksterhuis's (2004) instructions and distraction task closely. That is, the reported experiment was a careful hybrid of methods and materials used in persuasion and unconscious-thought research.

Second, the reported results were found under very particular circumstances. Specifically, unconscious thought produced attitudes based on argument quality when individuals had the goal to understand presented messages and were distracted from consciously thinking after the messages were encountered. Intuitively, however, it is probably more common for individuals to think consciously than unconsciously about personally relevant persuasive information. Yet there are likely many real-life circumstances in which unconscious persuasion could occur. For example, an individual may listen to a television advertisement about a new beneficial medication in which the negative side effects are quickly acknowledged. Immediately after the advertisement ends, the individual's infant may cry, preventing conscious thinking about the information. Nonetheless, the reported results suggest that such an individual may form an attitude based on unconscious considerations of the advertisement. Thus, the present findings highlight that persuasive information can change attitudes more often than was formerly thought.

#### UNCONSCIOUS THINKING OR ON-LINE JUDGMENTS?

Recently, Lassiter, Lindberg, González-Vallejo, Bellezza, and Phillips (2009) offered an alternative explanation for many of the results supporting the DWA (for similar ideas, see Lerouge, Marchiori, Klein, & Cleeremans, 2010). They note that in research following Dijksterhuis's (2004) paradigm, individuals are instructed to form impressions of objects prior to receiving object information (but see Bos et al., 2008). Therefore, participants may form and update impressions of objects as they learn new information, ultimately arriving at reasonable object impressions. In distraction conditions, Lassiter et al. argue that individuals do not further process the acquired information unconsciously. Rather, after the distraction task, individuals simply retrieve their earlier "on-line" impressions and report this judgment (Hastie & Park, 1986). However, in conscious-thought conditions, Lassiter et al. argue that participants might interpret instructions to think as indicating that they should abandon their initial on-line impression of the objects and further contemplate the information. However, these individuals' judgments are limited to the subset of information they can remember (i.e., they make memory-based judgments, Hastie & Park, 1986), and are therefore poor. Thus, individuals' judgments are likely to be suboptimal (memory-based) following a period of directed thinking compared to a period of distraction (on-line).

Nevertheless, Lassiter et al.'s (2009) alternative explanation does not account well for the reported results. First, following Lassiter et al.'s logic, individuals in the immediate conditions should report their on-line judgments rather than a memory-based judgment given they received no directive to think further about recalled information (for a similar interpretation of Lassiter et al.'s logic, see Strick, Dijksterhuis, & Van Baaren, 2010). As such, individuals in the immediate and unconscious-thought conditions should report comparable attitudes based on their on-line impressions. However, the results of the current experiment and many other experiments supporting the DWA effect are inconsistent with that implication (see, e.g., Strick et al., 2010). Rather, in the current experiment, only participants in the unconscious-thought conditions formed attitudes based on argument quality. Second, and related, the speed at which the messages were presented in the current experiment largely precluded the development of sound on-line judgments during information acquisition. As evidence, participants in the immediate conditions did not form more favorable attitudes in response to strong versus weak arguments, even though they were motivated to process the message. Therefore, the current research is best interpreted as indicating that individuals are thinking unconsciously in distraction conditions.

## FUTURE DIRECTIONS

We allude in this article to several ideas that arguably deserve empirical testing. First, personal relevance of the message topic was set at a high level for all participants in the current experiment; however, the reported results should not occur when the message is personally irrelevant or unimportant to participants (i.e., when they are not motivated to process the message). A replication of the present experiment in which the personal relevance of the message is varied could easily test this prediction, which is consistent with the research of Bos et al. (2008). Further, we have forwarded an untested prediction that individuals will base their attitudes on message-tangential cues when they are unable to think consciously or unconsciously, but will base their attitudes on message arguments when they can think either consciously or unconsciously (i.e., are distracted but have time to think unconsciously). This idea can be simply tested by introducing a cue factor (e.g., a high- versus low-credibility message author) to an experiment like the one reported, and this possibility certainly warrants future testing.

As a final example, future research could explore the various dimensions of information unconscious thought can consider in forming judgments. As discussed already, research has demonstrated that unconscious thought is sensitive to the valence (i.e., good vs. bad), quantity, and importance of information while rendering judgments. Also, research reported by Ham and Van den Bos (2010) reveals that unconscious thinking produces utilitarian moral judgments such as choosing harmful actions that will lead to good. The current investigation supports the possibility that unconscious thought can consider other dimensions, such as the rationality of presented ideas or outcome likelihood. Research that directly tests whether these additional dimensions, and perhaps others, do in fact influence the judgments made by unconscious thought could significantly increase our understanding of judgment, and inform predictions of what factors may differentially influence judgments produced by conscious or unconscious thinking processes.

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