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Experimental Induction of Biased Systematic Processing: The Directed-Thought Technique

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The concept of biased systematic processing is usually introduced after the fact to explain deviant persuasion patterns. In contrast, the authors introduce the directed-thought technique, an experimental way to examine induced biased systematic processing. Supporting the efficacy of this technique, two experiments found that directions to think positively or negatively attenuated the effects of the quality of the message on persuasion, even when involvement was high and regardless of whether the message was pro- or counterattitudinal. Instructions to concentrate on negative thoughts also produced negative attitudes, whereas instructions to concentrate on positive thoughts produced positive attitudes. These results confirm a causal role for the valence of cognitive responses in persuasion, which prior research has suggested less directly. The authors make recommendations for the future use of the directed-thought technique, especially regarding its use in understanding the circumstances that can overcome positive or negative message recipient biases.

Researchers working in the tradition of the dual-process models of persuasion, including the elaboration likelihood model (ELM; Cacioppo & Petty, 1979; Petty & Brock, 1981; Petty & Cacioppo, 1986) and the heuristic-systematic model (HSM; Chaiken, 1980, 1987; Chaiken, Liberman, & Eagly, 1989), have established much empirical support for the proposition that message recipients systematically process message content when they have both the motivation and the ability to do so. Important, the systematic message processing that results from high motivation or ability has been shown to be biased in a positive or negative manner under certain circumstances (e.g., when message recipients possess high prior knowledge; Wood, Kallgren, & Preisler, 1985). Additionally, researchers have recently begun to test hypotheses about the conditions under which systematic processing may be biased (e.g., Chaiken & Maheswaran, 1994; Liberman & Chaiken, 1992; Petty, Schumann, Richman, &

Strathman, 1993). However, these studies have, with few exceptions, introduced the concept of biased systematic processing as a post hoc explanation for persuasive patterns. In contrast, the two present studies show how the directed-thought technique, which directs participants to concentrate only on their favorable or unfavorable thoughts, allows for an a priori prediction of relatively biased processing of unambiguous messages. In so doing, this research also permitted a more direct test of the causal mediation of persuasion by the valence of cognitive responses (CRs) than previous studies have been able to produce.

CRs and Persuasion

Early studies on role playing suggested an important role for people's own thoughts in response to persuasive messages (e.g., Janis & King, 1954; Janis & Terwilliger, 1962; King & Janis, 1956). Building on this work, Greenwald

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(1968) formally proposed that persuasion is a function of people's own idiosyncratic thoughts in response to the message.¹ Specifically, if a message recipient responds with mostly favorable cognitions, positive attitude change should result; if the cognitions are mostly unfavorable (i.e., counterarguments or refutations), then negative change should occur. Indeed, a much-replicated finding is that favorable and unfavorable thoughts correlate highly with attitude change (e.g., Cacioppo & Petty, 1979; Osterhouse & Brock, 1970; Petty & Cacioppo, 1977). Similarly, messages designed and piloted to elicit predominantly positive versus negative CRs robustly produce attitudes with the same valence (e.g., Johnson, 1994; Petty & Cacioppo, 1979).

The dual-process models of persuasion further posit that CRs should prove particularly important for message recipients who have both the motivation and the opportunity to engage in systematic processing of message content (Cacioppo, Harkins, & Petty, 1981; Eagly & Chaiken, 1993). According to the dual-process perspectives, to the extent that both of these conditions are met, the amount and valence of cognitive responding to the message content should mediate attitude change (Eagly & Chaiken, 1993; Greenwald, 1968; Petty & Cacioppo, 1979). Thus, especially under conditions of high motivation and ability, the experimental presentation of strong rather than weak arguments has often been found to induce parallel patterns of CRs and attitudes (i.e., more positive attitude change is accompanied by more favorable thoughts and fewer counterarguments; e.g., Cacioppo & Petty, 1989; Petty, Wells, & Brock, 1976). For example, for Petty and Cacioppo's (1979) high-outcome-relevant-involvement (high-ORI) participants, strong arguments induced positive CRs and positive attitudes, whereas weak arguments induced negative CRs and negative attitudes. The establishment of a strong correlational association between CRs and attitude change has led to the widespread acceptance of the role of the extent and valence of message-related thinking in the mediation of attitude change. However, echoing Miller and Baron's (1973) concern, Eagly and Chaiken (1993) speculated that the CRs listed by participants actually reflect their newly changed attitudes rather than the responses they had while they were exposed to the message. Finally, researchers have expressed concern about whether argument quality's effect on persuasion results from perceptions of logical cogency or from differential argument valence (see Areni & Lutz, 1988; Eagly & Chaiken, 1993). By actively manipulating the valence of CRs rather than merely measuring them after the fact, the present research offered the opportunity to determine more directly whether CRs are causally tied to persuasion.

Relatively Biased Systematic Processing

In addition to positing that motivation and ability should generally increase relatively unbiased processing of message content, dual-process models also posit that various factors can bias message recipients' CRs and subsequent persuasion. For example, cognitive factors such as high prior issue knowledge (e.g., Johnson, Lin, Symons, Campbell, & Ekstein, 1995), extreme attitudes (e.g., Lord, Ross, & Lepper, 1979), or heuristic cues such as source credibility (e.g., Chaiken & Maheswaran, 1994) and motivational factors such as threats to health (e.g., Liberman & Chaiken, 1992) or impression-relevant involvement (e.g., Leippe & Elkin, 1987) might predispose participants to produce specific kinds of supportive or opposing thoughts (see also Petty & Cacioppo, 1986). For example, when a member of a pro-life, anti-abortion group receives a pro-choice message, he or she might employ systematic processing biased to defend the initial pro-life attitude.

Two recent studies have tested *a priori* predictions of biased processing in persuasion research. Petty et al. (1993) reported two tests of their hypothesis that positive mood would bias processing of messages by influencing the positivity of CRs generated in response to a persuasive message. They theorized and found that such biased processing is most likely to emerge under high-elaboration conditions and when messages are ambiguous rather than clearly strong or clearly weak (see Chaiken et al., 1989). Chaiken and Maheswaran (1994) predicted and found that a heuristic cue, in addition to operating as a simple decision rule, may also operate "indirectly by biasing the valence of systematic processing" (p. 461). Similar to Petty et al., they asserted that such biased processing should occur under high-elaboration conditions and with ambiguous messages. Although these authors' interest was mainly in the ambiguous-message conditions, important for our research are the results in the unambiguous-message conditions. As predicted by the HSM bias hypothesis, when participants read unambiguous strong or weak messages, there were no effects of the heuristic cue (credibility) on the valence of systematic processing for either high- or low-elaboration conditions. In other words, there was no evidence that the cognitive biasing factor had any effect on participants' CRs; moreover, in the unambiguous conditions, credibility had no biasing effect on attitudes.

Thus, the research to date has demonstrated that biased systematic processing of persuasive communications is most likely to occur when people are both motivated and able to process the message (e.g., Chaiken & Maheswaran, 1994; Petty & Cacioppo, 1986) and when the message provides ambiguous support for its position

(e.g., Chaiken et al., 1989; Chaiken & Maheswaran, 1994; Petty et al., 1993). In the HSM model, the bias hypothesis predicts that such cognitive biasing of messages will occur only when such conditions hold (e.g., Chaiken & Maheswaran, 1994). In other research, the invocation of the *biased systematic processing* moniker has nearly always appeared in post hoc interpretations of persuasion and/or CR patterns (e.g., in explaining why a high-knowledge group was more negative in response to strong arguments than a low-knowledge group; Wood et al., 1985). Indeed, in their discussion, Petty et al. (1993) suggested that "if in a given study, variable *A* produces a symmetrical interaction with argument quality whereas variable *B* produces an asymmetrical interaction with the same argument quality manipulation, this pattern would be suggestive of the fact that variable *B* is inducing more biased message processing than variable *A*" (p. 18). Thus, even with a priori predictions of biased processing, we are back at square one, examining post hoc interaction patterns.

THE PRESENT RESEARCH

In the present research, we made a priori predictions that our experimental manipulation of CR valence will bias systematic processing of unambiguously strong or unambiguously weak arguments. Specifically, we designed experimental task constraints to introduce such biases into participants' responses. If message recipients are directed to concentrate on only their favorable or only their unfavorable thoughts, they should act as positively or negatively biased processors of the message, respectively. A positively biased processor should respond positively even to weak arguments; a negatively biased processor should respond negatively even to strong arguments. Thus, for positively or negatively biased message recipients, the effect of argument quality should dissipate (see Petty & Cacioppo, 1986, p. 34). For example, a positively biased group should have equally favorable attitudes in response to strong arguments compared with a no-bias group, yet be more favorable in response to weak arguments than the no-bias group; a parallel but reversed pattern ought to appear for negatively biased groups in comparison to a no-bias control group. Thus, we expected that a positive bias would be more apparent in response to weak arguments and that a negative bias would be more apparent in response to strong arguments.

Although past studies strongly point toward a causal role for CRs in persuasion, the evidence that certain factors might induce biased processing has to date been somewhat sparse and usually post hoc. To lead the way for research to methodically examine biased systematic

processing of messages, it is necessary that researchers have a reliable and internally valid technique to induce this processing. Therefore, we designed our directed-thought technique, which, in the guise of the experimental procedure, provides a prompt to the message respondent to list anything positive while receiving the message; other participants are asked to list anything negative (see Kunda, Fong, Sanisto, & Reber, 1993, and McGuire & McGuire, 1996, for other examples of directed-thinking techniques; see Romero, Agnew, and Insko, 1996, Experiment 2, who provided counterarguments prior to message exposure in some conditions). Tesser's (1978) research demonstrated that instructions to think about an attitudes can make the attitude more extreme because thinking about an attitude that one holds tends to produce new beliefs and thoughts consistent with the attitude, with concomitant suppression of inconsistent thoughts. Similarly, Lammers (1982) instructed his participants to "try to think of arguments either against (counterargument scan) or in favor of (proargument scan)" the topic (p. 101); results showed a marginal polarization of attitudes consistent with the experimental instructions. However, in neither research paradigm were participants exposed to persuasive messages. In keeping with the CR literature reviewed above, it is the production and rehearsal of CRs in response to a message that should result in markedly positive or negative attitudes. Building on these early studies on mere thought, our studies were apparently the first to combine directed thought with the processing of an argument. It is crucial to note that although we influenced the valence of our directed respondents' thoughts, like the studies on mere thought, the actual content of their thoughts was entirely the production of the respondents.

Consistent with the literatures reviewed above, we expected to find that message recipients directed to think positively about a message would agree more, whereas those directed to think negatively would agree less. This finding would confirm that CRs are causally related to persuasion. However, consistent with the dual-process models' predictions, we should also be able to find evidence that directing people to think in a particular way about the message biases their systematic processing of arguments. In particular, the quality of the message arguments should also affect the pattern of persuasion observed. To show these biased systematic processing patterns, both of our experiments included controls who were directed merely to list whatever thoughts they had about the message. For these message recipients, we expected to see marked evidence of relatively unbiased systematic processing such that strong arguments would be more persuasive than weak argu-

ments. In contrast to this large argument-quality effect, we expected to see that the effect of argument quality would be smaller in the directed-CR groups. For example, message recipients asked to think negatively about a message will have an easier time doing so with a message designed to be weak rather than strong (e.g., Petty et al., 1976).

It is important to realize that these patterns hinge on message recipients' possessing enough ability and motivation to process the arguments. In the first experiment, we document this assumption through pilot message recipients' ratings of the issue and also examine whether the argument-quality effect on attitude obtains significance for controls. In the second experiment, we also manipulated ORI with the issue (Johnson & Eagly, 1989, 1990) to maximize processing of the message and to ensure that, at least in the high-ORI group, directed-CR participants had sufficient incentive to think about the issue in relation to their own futures. Moreover, to show the generalizability of these findings, we employed two different messages in this research—one proattitudinal (Experiment 1) and the other counterattitudinal (Experiment 2). Finally, we predicted that CR results would parallel the attitudes patterns, such that message recipients reporting predominantly favorable (unfavorable) thoughts were expected to express more positive (negative) attitudes. Additionally, indexes of cognitive responding were expected to correlate with attitudes, as predicted by the CR model of persuasion.

EXPERIMENT 1

One topic that is both timely and especially important for young adults is the contemporary concern with sexually transmitted diseases (STDs) and the role that condoms can play in preventing disease transmission. We presented a brochure containing a short, strong or weak proattitudinal message about the effectiveness of condoms as preventive of STDs and unwanted pregnancy to a sample of female college students (18 to 19 years old). In the directed-thought group, message recipients were directed to take a supportive position regarding the advocacy (i.e., to think and list only favorable thoughts while reading the message); an undirected control group received instructions to think and list any thoughts about the message while reading it.

Method

PARTICIPANTS

A total of 49 female undergraduates at Syracuse University participated for partial course credit in a 2 (directed positive thoughts vs. undirected control) \times 2 (argument quality: strong or weak) between-subjects factorial design.²

PROCEDURE

Participants participated in small groups (three to seven persons) with each participant assigned to an individual carrel in a psychology laboratory. Each carrel contained an IBM PC-compatible computer from which all study directions were given. Participants completed a short introduction to the computer, familiarizing themselves with the instructions and data-entry procedures. The computerized procedure ensured that responses were within the defined ranges and that all participants answered all questions. On the informed consent form and in the computer protocol, we emphasized to the participants that their responses would be confidential and anonymous.

Concurrent, initial thought-listing task. Participants were told that the psychology department was assisting in the development and testing of a brochure for the Peer Sexuality Group, an actual, student-run, on-campus organization. They were directed to read the brochure, which, following a brief introduction to the organization, provided a short article on condom use, using either strong or weak arguments. All participants read, "In this part of the study, we would like your input into a new brochure that the Peer Sexuality Group is developing. The leaflet discusses aspects of condom use." Establishing the directed-thought condition, the directions for participants were as follows:

In order to determine all possible reactions, the group would like to gather all possible arguments for and against the issue. Some students will be asked to list positive statements and others will provide negative statements. You have been selected at random to provide positive arguments about the issue. As you read through the leaflet, list in the margins all the positive thoughts that come to mind. We are only interested in the positive and favorable reactions that you may have about this message. Please do not write down any reactions you may have that are negative or unfavorable toward the message.

The instruction that other participants would provide negative statements helped to make the instruction to write only positive thoughts seem more plausible. Undirected control participants were instructed as follows:

As you read through the leaflet, list in the margins all the thoughts that come to mind. We are interested in any reactions you may have about this message. Please write down any reactions you may have toward it.

Participants were directed to press the spacebar when they were finished with this task to continue with the study. Two independent raters, blind to participants' condition, rated the thoughts listed by the participants in the margins of the pamphlet as positive, negative, or

neutral. The two independent ratings of positive, negative, and total thoughts were highly reliable ($r_s \geq .82$). The two raters' scores were averaged for each of these categories and an index was constructed using the following formula:

$$\text{Thought-valence index} = \frac{\text{Positive message-relevant thoughts} + 1}{\text{Message-relevant thoughts} + 1}$$

(The constant of 1 is added to the numerator and denominator to avoid divisions by zero.) Scores approaching 1.00 indicate participants listed predominantly positive thoughts, whereas scores approaching 0.00 indicate participants listed predominantly negative thoughts (see Johnson et al., 1995). This index was strongly related to the numbers of positive and negative thoughts listed, $r_s \geq .62$, $p_s < .001$. Upon completion of this task, participants were instructed to return the brochure to the folder to prevent further reading of the arguments or the listed thoughts. The thoughts written in the margins served as an initial measure of participants' CRs.

Argument-quality manipulation. Two formats of the message were used, one providing more factual information (i.e., statistics) and credible arguments (hereafter referred to as the strong message) and the other providing less factual information and less credible arguments (hereafter referred to as the weak message). In a pilot study, using 9-point rating scales ranging from 1 (*low*) to 9 (*high*), the strong message was rated as stronger than the weak message ($M_s = 7.52$ and 5.95 , respectively), $F(1, 61) = 18.39$, $p < .001$; and the strong message elicited more favorable attitudes than the weak message, $F(1, 61) = 6.07$, $p < .05$, but both conditions' mean scores were very high (strong $M = 8.48$, weak $M = 7.95$), confirming that this message was a proattitudinal one. The strong message was also perceived as more factual, but not as more complex or less emotional than the weak message, for pilot study participants. Further, both messages elicited very high personal relevance scores ($M_s = 7.74$ and 7.25), indicating high levels of perceived relevance for the comparable pilot study cohort even in the absence of an explicit manipulation of this variable in Experiment 1.

Attitude measures. Next, participants responded to five questions using 9-point semantic differential scales. The first question asked to what extent they agreed with the arguments in the brochure (*very little* to *very much*); the other four required the completion of the stem "Condoms are . . ." with the following endpoints: *foolish-wise*, *unfavorable-favorable*, *beneficial-harmful*, and *good-bad*. Participants next completed the Attitudes Towards Condoms (ATC) Scale (Brown, 1984; Cronbach's $\alpha = .96$). The ATC Scale was standardized, and this scale, the agreement measure, and the attitude measures were

found to be closely related, with r_s ranging from .36 to .68, $p_s < .01$; thus, they were combined to form a single composite attitude score ($\alpha = .75$).

Recalled CRs. Participants were instructed to take a blank boxed sheet and, similar to other contemporary persuasion studies, in the undirected condition, to "write down any thoughts you can remember having while you were reading the brochure about condoms." Participants in the directed-thoughts condition read, "Although you were directed to write only positive thoughts about the brochure, we now would like to see what thoughts you remember having while you read the brochure, even if they are negative." Participants had 2 min to complete this task, which served as a second measure of cognitive responding. In their next task, participants indicated the number of thoughts they had listed on the boxed sheet and rated each thought by entering a number from 1 to 9 (1 = *negative* and 9 = *positive*); an index was produced for each participant by taking the mean of the rated thoughts.

Thought-valence task. Two independent judges rated the participants' recalled thoughts as message relevant or message irrelevant and rated each thought as positive, negative, or neutral. This combined measure resulted in very high correlations between judges, with r_s ranging from .70 to .85. For analyses, an index was constructed using the following formula:

$$\text{Thought-valence index} = \frac{\text{Positive message-relevant thoughts} + 1}{\text{Message-relevant thoughts} + 1}$$

Additional measures. Participants were instructed to indicate, on 9-point semantic differential scales, the perceived quality of the brochure, the credibility of the arguments, the perceived strength of the arguments, their overall evaluation of the brochure, and the degree to which sufficient information was provided in order for them to make an informed decision. Participants were further asked to indicate their feelings about condoms and how confident they were in their opinions. These ratings proved to be closely related to each other ($r_s \geq .65$, $p_s < .001$) and were collapsed to form a composite brochure evaluation rating ($\alpha = .94$) with the exception of the confidence rating, which was not closely related to any other rating and was thus treated as a separate measure.³ Also, participants' CRs were examined to see whether strong arguments elicited predominantly favorable thoughts and weak arguments elicited predominantly unfavorable thoughts (see Petty & Cacioppo, 1986).

Finally, participants were debriefed. They were given a copy of the original Peer Sexuality Group brochure and instructed to disregard the information about condoms presented during the study.

Results

A two-way ANOVA with CR condition and argument quality as the factors was applied to all dependent variables, and the relevant planned comparisons were made. The means for each of the main dependent variables appear in Table 1.

MANIPULATION CHECKS

Initial CRs. To determine if the directed participants were able to follow the instructions to list only favorable thoughts, we calculated the mean number of positive and negative thoughts produced by participants in both conditions. All three measures were significantly different in the expected directions; that is, the positive-CR participants wrote more positive and fewer negative thoughts compared with the undirected control participants, resulting in a more positive index. In separate ANOVAs, a main effect for CR condition appeared for the mean number of positive thoughts, mean number of negative thoughts, and the initial-thoughts index, $F(1, 45) = 39.92, 18.06, \text{ and } 31.01$, respectively, $ps < .0001$. Thus, the directed-thoughts participants did follow the instructions to list favorable thoughts.

Argument quality. In the pilot study, participants rated the strong message as significantly stronger than the weak message ($Ms = 7.52$ and 5.95 , respectively), $F(1, 62) = 18.39, p < .001$. Additionally, in the current study, strong arguments tended to be rated higher on the composite brochure evaluation rating ($Ms = 6.56$ and 5.55 , respectively), $F(1, 45) = 3.17, p < .06$.

ATTITUDES

As predicted, the main effects of positively directed participants' more favorable attitudes compared with controls ($Ms = 7.87$ and 7.02 , respectively, $p < .05$.) and strong arguments eliciting more agreement compared with weak arguments ($Ms = 7.79$ and 7.15 , respectively, $p < .05$) were qualified by the interaction, such that strong arguments were equally persuasive ($Ms = 7.85$ and 7.89), but weak arguments elicited reliably more favorable attitudes for the positive-CR participants ($M = 7.89$) compared with the undirected-CR participants ($M = 6.35$), $F(1, 45) = 8.94, p < .01, F(1, 45) = 6.65, p < .025$, for interaction. The upper right portion of Figure 1 shows the pattern of persuasion elicited in the positive and undirected-CR conditions.

CRs

Three indexes of cognitive responding were calculated: (a) the *initial-thoughts index*, from the thoughts the participants wrote in the margins of the pamphlet in response to the instructions; (b) the *recalled-thoughts index*, from the participants' own ratings of their recalled thoughts; and (c) the *thought-valence index*, from ratings

TABLE 1: Attitudes and Cognitive Responses (CRs) as a Function of Condition of Argument Quality and Directed-CR Condition, Experiment 1

	Strong Arguments		Weak Arguments	
	Positive	Control	Positive	Control
Attitude				
<i>M</i>	7.85 _a	7.75 _a	7.89 _a	6.35 _b
<i>SD</i>	0.82	0.95	0.62	1.34
Directed-thoughts index ^{1,2}				
<i>M</i>	0.92 _a	0.66 _b	0.96 _a	0.58 _b
<i>SD</i>	0.15	0.24	0.15	0.28
Thought-valence index ^{2,3}				
<i>M</i>	0.82 _a	0.67 _{ab}	0.75 _{ab}	0.60 _b
<i>SD</i>	0.19	0.16	0.29	0.28
Recalled thoughts ⁴				
<i>M</i>	6.57 _a	5.21 _{ab}	6.12 _{ab}	4.72 _b
<i>SD</i>	2.15	1.27	1.83	2.41
<i>n</i>	10	12	14	13

NOTE: Within each row, means having a common subscript do not differ significantly at $p < .05$ via Tukey's HSD test.

1. Derived from thoughts listed while reading communication.
2. Low values imply predominately negative cognitive responding, and high values imply predominantly positive cognitive responding.
3. Derived from thoughts recalled after reading communication.
4. Subjects' ratings of own CRs (recalled after message exposure).

of the recalled thoughts by two independent judges. As expected, these three indexes were moderately correlated (r .32 ≤ .56). However, although there was a reliable relation between participants' recalled thoughts and attitudes, both across groups ($r = .48, p < .001$) and in the undirected control group, the within-cell correlations for the positively directed participants were not significant. A repeated measures analysis of the initial-thoughts index and the thought-valence index revealed that the main effects were qualified by the interaction with CR condition, such that for the control participants, the thoughts were equally positive initially and at recall ($Ms = .62$ and $.63$, respectively); for the positive-CR group, however, the initial thoughts were more positive than recalled thoughts ($Ms = .95$ and $.77$, respectively), $F(1, 45) = 4.74, p < .05$. Also, the positive-CR group listed significantly more thoughts than the undirected group initially and at recall ($ps < .05$). There were no interactions with argument quality for any of these variables.

Discussion

The results of this study lend some support to our prediction that directed participants would process the message in a positively biased manner. Participants directed to think positively about a persuasive message expressed reliably more favorable attitudes toward the advocacy (especially when presented with weak arguments) than undirected participants, consistent with predictions stemming from the CR model (Greenwald,

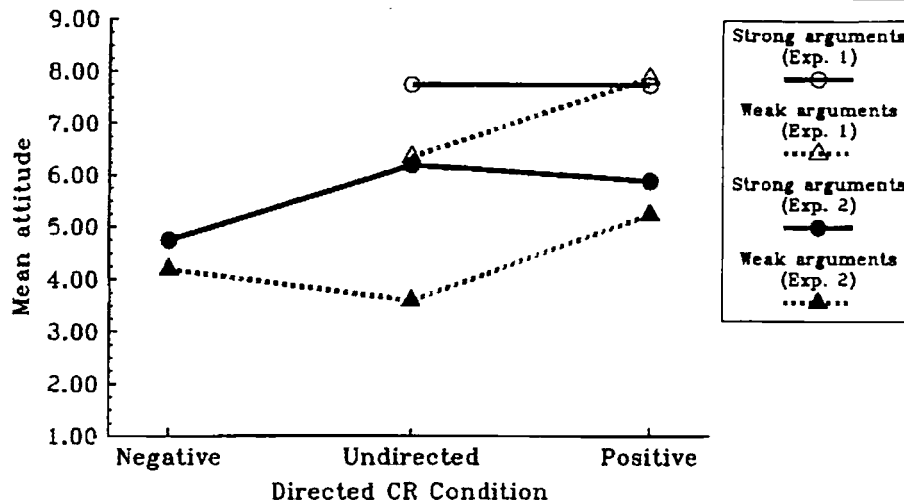


Figure 1 Attitude as a function of the interaction between directed positive cognitive responses (CRs) and argument quality (upper portion, Experiment 1) and between directed-CR condition and argument quality (lower portion, Experiment 2).

1968). In the undirected group, strong arguments were more persuasive than weak arguments, replicating findings in the literature for highly involved participants (see Johnson & Eagly, 1989, 1990; Petty & Cacioppo, 1990). The finding that argument quality significantly impacted the attitudes and CRs of the undirected-thought participants suggests that they systematically processed the messages in a relatively unbiased fashion (e.g., Cacioppo & Petty, 1979; Osterhouse & Brock, 1970; Petty & Cacioppo, 1977).

The attitudes results also support predictions of biased processing in the directed-positive-CR condition: Even though the issue was highly involving, the directed participants were equally persuaded by the strong and weak versions of the message. Similarly, the strong message was equally persuasive for both groups, and the weak message was more persuasive for the directed group than the undirected group. However, the lack of a reliable association between attitudes and CRs for the directed group may be problematic. One plausible interpretation of this null finding is that the directed-thought instructions caused restriction of range in one or both variables, thereby minimizing the correlation. For example, the standard deviation for the attitude measure for the directed group was 0.69, whereas it was 1.35 for the undirected group. Another interpretation is that persuasion of the directed versus undirected group may have been the result of a peripheral persuasion process. It is plausible that participants asked to concentrate on their positive responses used this request as a cue to assert a positive attitude. Moreover, these directions, in conjunction with a message purportedly emanating from an on-campus group, the tacit support of school faculty, and the brochure's concern with the sexual safety of the

participants' peers, may have led participants to express positive attitudes. Moreover, Experiment 1 contained no demonstration that negative directed thoughts could minimize persuasion. Further, although the results of both the pilot study and Experiment 1 suggest that our findings apply in the case of fully motivated and able participants, we employed no methodological procedures to show this was the case. Finally, the first study included only female participants; it would be good to know whether these patterns generalize to male participants. We addressed these concerns in Experiment 2.

EXPERIMENT 2

The topic for this study—implementation of senior comprehensive exams as a requirement for graduation—was chosen for its counterattitudinal nature and because results stemming from its use can easily be compared with the many prior studies using this issue. To show how motivation to process the message under the directed-thought conditions might actually impact results, ORI was manipulated by telling the participants that the exams would be implemented either at their own university the next year or at a distant university in 10 years. Including such a manipulation ensured that at least half of the participants had sufficient motivation to read the message. However, despite the fact that, like ORI, the CR manipulation constitutes another processing set, we did not expect our CR manipulation to interact with ORI: ORI is essentially an accuracy-seeking motive, whereas our directed-CR manipulation is the motive to produce negative or positive thoughts regarding a message. These instructions should focus the message recipient in an incidental manner on a biased set of

cognitions about the message. Thus, ORI should be unlikely to interact with directed thinking. Nonetheless, we did expect for ORI to interact with argument quality. Specifically, Johnson and Eagly's (1989) meta-analytic review provided evidence for the interaction of ORI and argument quality such that high (vs. low) ORI motivates participants to process the message content, with strong arguments increasing persuasion and weak arguments reducing it. The effects of involvement on persuasion are explained quite capably within a CR model: To the extent that persuasion is mediated by the number and valence of CRs (Eagly & Chaiken, 1993; Petty & Cacioppo, 1986), the impact of involvement in increasing the amount of message-relevant thinking is crucial. With respect to ORI, involvement will decrease persuasion when messages elicit primarily unfavorable thoughts and increase persuasion when messages elicit primarily favorable thoughts (see Johnson & Eagly, 1989). Finally, strong and weak versions of the message advocating the implementation of the exams were developed (from arguments used in previous persuasion research)⁴ in a pilot study using an independent sample of undergraduates from the same participant pool, and we established that this advocacy was counterattitudinal to the sampled population.

Method

PARTICIPANTS AND DESIGN

Undergraduates ($n = 129$ females and $n = 56$ males, total $N = 187^5$) at Syracuse University participated in exchange for extra course credit, with the restriction that they should not have participated in either Experiment 1 or the pilot study (to avoid contaminating the data through familiarity with the arguments).⁶ Participants were randomly assigned to 1 of the 12 cells of a 3 (positive- vs. negative- vs. undirected-CR condition) \times 2 (high vs. low ORI) \times 2 (strong vs. weak arguments) between-subjects factorial design. The materials were presented in booklet form, and participants completed these booklets in a large lecture hall, immediately prior to a regularly scheduled class period.

MATERIALS

The strong and weak versions of the message developed in a pilot study were presented in booklet form as a proposal to implement senior comprehensive exams at the university. The strong version of the message argued, in more embellished form, that the exams should be adopted because (a) the quality of undergraduate teaching improves at schools with the exams; (b) schools with the exams attract larger and more well-known corporations to recruit students for jobs; (c) graduate and professional schools show a preference for undergraduates who have passed a comprehensive exam; (d) university

alumni would increase financial support if the exams were instituted, allowing a tuition increase to be avoided; (e) average starting salaries are higher for graduates of schools with comprehensive exams; and (f) job prospects for graduates might be improved if senior comprehensive exams were required. The weak version argued, in embellished form, that the exams should be adopted because (a) graduate students complain that because they have to take comprehensives, undergraduates should take them also; (b) the risk of failing the exam is a challenge most students would welcome; (c) by not administering the exams, a tradition dating back to the ancient Greeks is being violated; (d) most of (the source's) friends support the idea of taking a senior comprehensive exam; (e) requiring graduate students but not undergraduates to take the exams is analogous to racial discrimination; and (f) the difficulty of the exam would prepare one for later competitions in life.

PROCEDURE

The study was framed as a joint project by the students' own university and the University of Florida to develop a proposal on the adoption of senior comprehensive exams. The booklets that participants received indicated that the researchers needed to assess all the possible thoughts that students could provide so that a more complete assessment of the proposal could be made. After completing the consent form, participants read the introductory statement, which detailed the attitude issue and manipulated directed-CR condition and involvement. The directed-CR manipulation was established by directing participants to think and list either positive and favorable thoughts, negative and unfavorable thoughts, or any thoughts. The involvement manipulation was established by stating that the proposal would take place at the participant's own university next year (and thus would be relevant) or at the University of Florida in 10 years (and thus would not be relevant for participants).

Message presentation. All participants read a proposal on the implementation of a senior comprehensive exam requirement; the message contained either strong or weak arguments, thus establishing the argument-quality manipulation. Participants were instructed to think about the message and topic while reading the proposal and to list all the thoughts that came to mind in the margins of the message. Participants in the directed-thoughts conditions read the following (with differential ORI instructions in parentheses):

Carefully read the following instructions: Beginning on the next page is an article that discusses the proposed implementation of a senior comprehensive exam at Syracuse University (University of Florida) to go into

effect next year (in 10 years' time). In order to gauge students' reactions, the University Board would like to gather all possible arguments about the issue. Some students will provide only favorable arguments and some will provide only unfavorable arguments. You have been randomly assigned to provide favorable (unfavorable) arguments about the proposal. As you read the article, write down in the margins all the favorable (unfavorable) thoughts that come to mind. We are only interested in the favorable and positive (unfavorable and negative) reactions that you may have. Turn the page now and read the article, writing down your thoughts as you read.

Participants in the undirected-thoughts (control) condition read the following:

Carefully read the following instructions: Beginning on the next page is an article that discusses the proposed implementation of a senior comprehensive exam at Syracuse University (University of Florida) to go into effect next year (in 10 years' time). In order to gauge students' reactions, the University Board would like to gather all possible arguments about the issue. As you read the article, write down in the margins all the thoughts that come to mind. We are interested in any reactions that you may have. Turn the page now and read the article, writing down your thoughts as you read.

Two independent raters, blind to participants' condition, rated the thoughts listed by the participants on a 7-point semantic differential scale (1 = *negative* to 7 = *positive*). The two judges' independent ratings were highly reliable, $r = .91$, $p < .0001$. To construct the initial-thoughts index, the two raters' scores were averaged for each of these categories, and an index (in effect, a mean rating) was produced for each participant by summing the ratings for each thought reported⁷ and dividing this number by the total number of thoughts listed.

Message evaluation. Before completing the attitude measures, participants were told that "because your own opinion about the topic of senior comprehensive exams might influence your judgments of the message, I would like to see what your own opinions are." Participants then rated the proposal on 9-point semantic differential scales (*bad-good*, *unfavorable-favorable*, *negative-positive*, *con-pro*). Participants first completed these four attitude measures and then completed a measure of agreement with the proposal, and this item was combined with the attitude measures (Cronbach's $\alpha = .98$ for the five composites) to form a composite postmessage attitude measure.

Recalled CRs. Participants were told to "list as many thoughts about the message as you can. Do not restrict yourself to positive or negative thoughts but list any that came to mind while you were reading the message."

They were then instructed to rate the valence of these recalled thoughts on a 7-point semantic differential scale (1 = *negative* to 7 = *positive*). Two independent judges, blind to condition, rated the participants' recalled thoughts along two mutually exclusive dimensions—message relevant and message irrelevant; the judges were also instructed to cover the participants' own ratings and rate each thought on a 7-point semantic differential scale. The two judges' codings of the message-relevant thoughts were highly reliable, $r = .77$, $p < .0001$, and their ratings were subsequently averaged. The participants' ratings and the mean judges' rating were strongly related, $r = .66$, $p < .0001$, and these two ratings were averaged to form a composite recalled-thoughts measure. An index (in effect, a mean rating) was produced for each participant by summing the averaged ratings for each message-relevant thought and dividing this number by the total number of message-relevant thoughts listed.⁸

Cued argument recall. To determine whether participants' recall of message arguments impacted persuasion, participants read six sentences from the message with blanks replacing one or two key words and completed as many of the sentences as possible. For example, participants reading the strong version of the message were asked to complete the following sentence (presented here with the missing key words in *italics*): "An *important* feature of the comprehensive exam requirement is that it has led to an *improvement* in the quality of undergraduate teaching in the schools where it has been instituted." Participants reading the weak version were asked to complete the following sentence: "I cannot understand how universities can think that something is of benefit for a *graduate* degree and not think it is of the same benefit for an *undergraduate* degree." Proportion of key words correct served as the recall score.

Manipulation checks. To judge the success of the manipulations, a number of manipulation check items were included in the questionnaire. For the ORI manipulation, participants were asked (a) "How personally relevant do you find the issue of senior comprehensive exams?" (*not at all* to *very much*); (b) "How involving did you find the message while you were reading it?" (*not at all* to *very much*); (c) "How much do you think the message concerns you?" (*not at all* to *very much*); and (d) "How much effort did you put into reading and evaluating the message?" (*not much* to *very much*). These ratings were combined (with the exception of the effort rating, which proved to be unrelated to the other three) into a composite measure of involvement ($\alpha = .74$).

For the argument-quality manipulation, participants were asked (a) "Overall, what was the quality of the message?" (*poor* to *excellent*), (b) "How convincing did

TABLE 2: Mean Ratings and Standard Deviations of Main Dependent Variables, Experiment 2

	High Outcome-Relevant Involvement						Low Outcome-Relevant Involvement					
	Positive		Neutral		Negative		Positive		Neutral		Negative	
	Strong	Weak	Strong	Weak	Strong	Weak	Strong	Weak	Strong	Weak	Strong	Weak
Attitude												
M	5.84	4.94	6.04	2.95	5.72	3.81	5.98	5.17	6.14	4.08	4.58	4.51
SD	2.20	2.51	1.88	1.83	2.76	2.17	1.95	2.49	1.97	1.94	1.98	2.22
Involvement												
M	6.09	5.83	7.02	4.73	6.69	5.31	5.65	4.95	5.61	4.23	5.67	4.59
SD	1.67	1.85	1.26	2.59	1.63	2.19	1.74	1.64	1.55	1.27	1.38	1.66
Effort												
M	6.47	6.61	6.59	6.25	6.25	7.12	6.79	5.42	6.22	5.25	5.55	6.06
SD	1.42	1.42	1.28	2.18	2.41	1.58	1.03	1.74	1.59	1.41	1.82	1.83
Argument quality												
M	5.54	3.97	5.97	2.95	5.94	3.24	5.90	4.02	5.43	2.80	4.93	3.35
SD	1.23	1.18	1.09	1.66	1.23	1.07	0.98	1.72	1.34	1.32	1.37	1.29
Message recall												
M	0.57	0.73	0.53	0.69	0.50	0.67	0.59	0.58	0.48	0.64	0.47	0.65
SD	0.22	0.09	0.21	0.13	0.15	0.16	0.19	0.16	0.16	0.22	0.17	0.12
Recalled thoughts ^a												
M	4.80	3.56	4.50	2.44	3.95	3.00	4.58	3.30	3.80	3.07	3.17	2.92
SD	1.10	1.17	1.43	1.37	1.01	0.97	1.14	1.58	1.50	1.17	1.52	1.02
Initial thoughts ^b												
M	6.02	5.29	2.60	2.08	2.73	1.97	6.14	5.75	2.70	2.55	2.30	2.48
SD	0.68	1.33	2.32	1.07	1.64	0.52	0.80	0.99	2.12	1.11	0.39	0.39

NOTE: All ratings were made on 9-point scales (ranging from 1 = *low* to 9 = *high*) except message recall, which is proportion correct, and the indices, which were scored on 7-point scales.

a. Subjects' recalled-thoughts index.

b. Directed-thoughts index.

you find the arguments in the message?" (*not at all* to *very convincing*); (c) "How strong were the arguments in the message?" (*very weak* to *very strong*); (d) "How factual would you say the language in the message was?" (*very factual* to *not at all factual*; reverse scored); (e) "Overall, did you find the language in the message complex or simple?" (*very simple* to *very complex*); (f) "How emotional would you say the language in the message was?" (*very emotional* to *not at all emotional*; reverse scored); and (g) "How carefully was the message thought out?" (*not at all* to *very carefully*). These ratings were combined (with the exception of the emotionality rating, which proved to be unrelated to the others and was thus treated as a separate rating) into a composite rating of quality ($\alpha = .90$). Participants were asked several other questions that assessed the degree to which sufficient information was provided for them to reach a valid opinion, how confident they were in their opinions, and the degree to which the message made them feel more confident in their opinions. These three ratings did not prove to be sufficiently related to form a composite measure, and thus were treated separately. Participants in the directed-CR conditions did not report more effort, more confidence in their opinions, or greater involvement than the undirected participants.

Results

We applied a three-way ANOVA with CR condition, ORI, and argument quality as the factors to all dependent variables and then made the relevant planned comparisons. Analyses that included sex of participant as a factor revealed no significant effects, so this factor was excluded from further analyses.⁹ The means and standard deviations for each of the main dependent variables appear in Table 2.

MANIPULATION CHECKS

ORI. Compared with low-involvement participants, high-involvement participants rated themselves as more involved ($M_s = 5.03$ and 5.91 , respectively), $F(1, 175) = 13.90$, $p < .001$, and as expending more effort reading and evaluating the message ($M_s = 5.90$ and 6.50 , respectively), $F(1, 175) = 5.47$, $p < .05$.

Argument quality. Participants rated the message as stronger on the argument-quality measure when they read the strong-arguments version ($M = 5.63$) compared with when they read the weak-arguments version ($M = 3.29$), $F(1, 175) = 147.53$, $p < .0001$. The only other effect was a main effect for CR condition on the quality measure, such that participants in the positive condition rated

the message as stronger ($M = 4.81$) than those in the negative and undirected conditions ($M_s = 4.22$ and 4.16 , respectively), $F(2, 175) = 4.08, p < .05$.

Traditionally, strong arguments are expected to elicit more favorable CRs than weak arguments, and our recalled-thoughts index proved more favorable when participants read the strong version of the message compared with the weak version ($M_s = 4.12$ and 3.14 , respectively), $F(1, 175) = 26.30, p < .0001$. Compared with weak arguments, strong arguments (a) provided more information sufficient to make a decision about the advocacy, (b) increased participants' confidence in their opinions, and (c) were less emotional in language. Understandably, participants also rated themselves as more involved after reading strong compared with weak arguments.¹⁰

Directed CRs. The directed-CR manipulation was successful: Positive-CR participants' initial-thoughts index was reliably more positive ($M = 5.77$) than those of both the undirected-CR ($M = 2.49$) and negative-CR ($M = 2.36$) participants, $F(2, 161) = 110.33, p < .0001$, but the negative-CR participants' index did not differ from that of the undirected participants. However, the negative-CR participants were more negative than the midpoint of the 7-point scale (4), as were the undirected participants, $p_s < .0001$; the counterattitudinal nature of the issue probably accounts for the undirected participants being so negative. Similarly, the positive-CR participants were more positive than the midpoint, $p < .0001$.

Further, consistent with our hypothesis about biased systematic processing, there was a significant interaction between CR condition and argument quality on the number of thoughts listed, $F(2, 175) = 22.09, p < .0001$. Although the mean valence of thoughts did not discriminate between undirected- and negative-CR participants, Tukey's HSD post hoc comparisons showed ($p < .05$) that negative-CR participants did report more thoughts ($M = 5.84$) in response to the weak arguments compared with the undirected-CR ($M = 4.64$) and positive-CR ($M = 2.89$) participants. Thus, negative-CR participants did do more negative thinking than undirected participants in the weak-arguments condition, suggesting that, when directed, the negative participants found it easier to produce negative thoughts in response to weak arguments compared with strong arguments. Similarly, positive-CR participants wrote more thoughts ($M = 5.45$) in response to the strong arguments compared with the undirected-CR ($M = 2.07$) and the negative-CR ($M = 3.65$) participants, suggesting that, when directed, the positive participants found it easier to produce positive thoughts in response to strong arguments compared with weak arguments. Finally, the positive-CR participants' recalled-thoughts index was more positive ($M = 4.13$) than those

of the undirected-CR ($M = 3.44$) and the negative-CR ($M = 3.26$) participants, $F(2, 175) = 7.20, p < .001$, although there was no difference between the latter two conditions' indexes.

ATTITUDES

As predicted, the CR \times Argument Quality interaction was significant, $F(2, 175) = 4.28, p < .05$, and qualified the predicted main effects of CR condition. Overall, those directed to list positive thoughts were more persuaded than those directed to list negative thoughts; and strong arguments elicited more agreement than weak arguments. However, as shown in the lower portion of Figure 1, for the undirected participants, strong arguments were more persuasive than weak arguments ($M_s = 6.16$ and 3.58 , respectively), $F(1, 175) = 26.05, p < .0001$. However, strong and weak arguments were equally persuasive for positive participants ($M_s = 5.94$ and 5.33 , respectively), $F(1, 175) = 1.19, p = .28$, and negative participants ($M_s = 4.86$ and 4.12 , respectively), $F(1, 175) = 2.21, p < .14$. Further, the interaction revealed that strong arguments were equally persuasive for the positive and undirected groups and that weak arguments were equally persuasive for the negative and undirected groups ($F_s < 1$). Figure 1 also illustrates the considerable similarity in the pattern of persuasion for the positive-CR and undirected groups in both experiments.

The prediction that ORI would interact with argument quality received almost significant support, $F(1, 175) = 3.78, p = .0535$: The tendency for strong arguments to persuade more than weak arguments was more marked when ORI was high compared with when it was low. Examination of the simple main effects reveals that when ORI was low, strong and weak arguments differed only marginally ($M_s = 5.48$ and 4.59 , respectively), $F(1, 175) = 3.01, p < .09$. When ORI was high, strong arguments were much more persuasive than weak arguments ($M_s = 5.98$ and 3.97 , respectively), $F(1, 175) = 18.01, p < .0001$. The three-way interaction was nonsignificant, $F(1, 175) = 0.80$ (see Figure 2).

CRs

As expected, the participants' recalled-thoughts index was moderately correlated with the initial-thoughts index, $r = .30, p < .0001$. Predictions stemming from the CR model of persuasion would be supported if the thought-listing indexes are positively related to measures of attitude, and these results are presented next.

Initial thoughts. As reported above, the positive-CR participants' initial-thoughts index was more positive than the indexes of the undirected and the negative-CR participants, resulting in a pattern closely conforming to that of attitudes. Further, the initial-thoughts index was reliably related to attitudes, $r = .28, p < .001$. As expected,

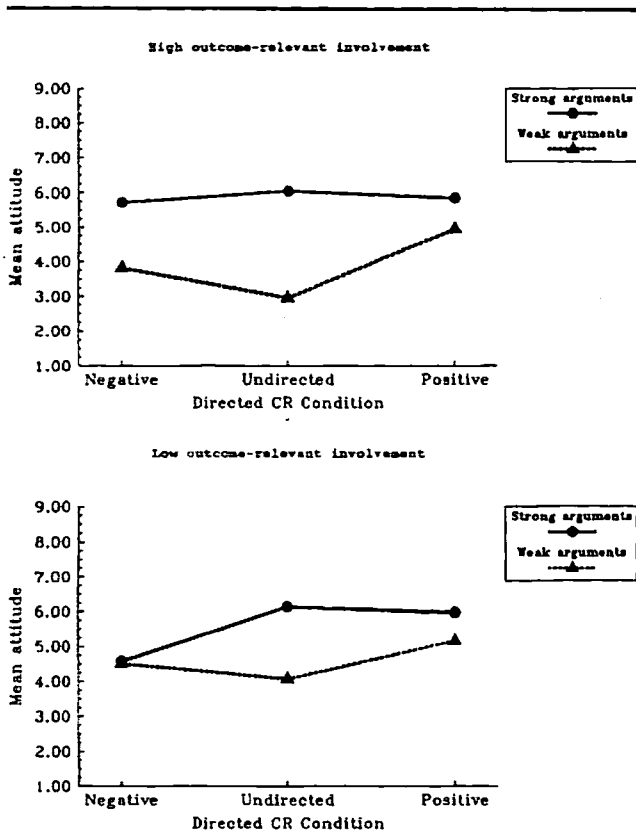


Figure 2 Attitudes as a function of argument quality and directed cognitive responses (CRs) as a function of high (upper panel) and low (lower panel) outcome-relevant involvement, Experiment 2.

examination of the association between the initial thoughts and attitudes within CR condition revealed moderate to high correlations for both positive-CR ($r = .47, p < .001$) and negative-CR ($r = .28, p < .05$) participants. Contrary to expectations, however, initial thoughts (which is a more immediate measure of idiosyncratic cognitive responding for this condition) and attitudes were not significantly related for the undirected participants ($r = .11, ns$). Finally, and importantly, covarying on the initial-thought-valence index made the main effect of CR condition disappear, $F < 1$; covarying also on the interaction of the initial-thought-valence index with the CR and argument-quality variables made the interaction of CR and argument quality disappear, $F < 1$. Thus, the effects of the CR condition on persuasion appear to be due to the CRs that message participants produced in response to the CR instructions.

Recalled thoughts. As reported above, participants in the positive-CR condition rated their thoughts as more positive compared with the undirected and the negative-CR participants. As expected, this pattern parallels that of the main effect of CR condition on attitudes. Similarly,

participants also reported more favorable thoughts in response to the strongly argued message compared with the weakly argued message. However, there was no overall interaction between CR condition and argument quality on the recalled-thoughts measure. As expected, however, there was a strong association between the recalled-thoughts index and attitudes ($r = .59, p < .0001$), which also held within each condition ($r_s .47 \leq .68, p_s < .001$), offering substantial support for the CR mediation hypothesis.

A repeated measures analysis with initial- versus recalled-thoughts indexes as the repeated factor, and CR condition, argument quality, and ORI as between-subjects factors, revealed no difference in the favorability of the listed thoughts initially compared with recall. However, the main effects of CR condition and argument quality on the favorability of thoughts listed were qualified by the interaction between the thoughts factor and CR condition, $F(2, 161) = 42.97, p < .0001$, and the interaction between the repeated factor and argument quality, $F(1, 161) = 7.10, p < .0001$. Tukey's HSD post hoc comparisons ($p < .05$) showed that the negative and undirected groups' indexes were more favorable at recall ($M_s = 3.20$ and 3.44 , respectively) than initially ($M_s = 2.36$ and 2.49 , respectively). For the positive group, the indexes were significantly less favorable at recall ($M = 4.02$) than initially ($M = 5.77$). Follow-up tests also showed that initially, strong and weak arguments elicited equally unfavorable thoughts ($M_s = 3.54$ and 3.17 , respectively), but when thoughts were recalled, strong arguments elicited more favorable thoughts compared with weak arguments, ($M_s = 4.09$ and 3.02 , respectively). The between-subjects factors of argument quality and involvement also produced a marginally significant interaction ($p < .06$), the pattern of which followed the results for attitudes: The tendency for strong arguments to produce more positive thinking than weak arguments was more pronounced for high- than low-ORI participants.

INVOLVEMENT

As reported above, high-involvement participants rated themselves as more involved, and as expending more effort reading and evaluating the message, than low-involvement participants. In addition to the overall predicted finding that argument quality and involvement interacted to produce differential persuasion, the CR measures revealed that involvement impacted participants' responses: When involvement was high, the recalled-thoughts index predicted attitudes to a significantly greater extent compared with when involvement was low, $r_s = .71$ and $.48$, respectively, $p < .0001, F(1, 183) = 6.32, p < .05$, for interaction in the moderated regression. In addition, although the initial-thoughts index predicted attitudes when involvement was high, $r = .37, p < .05$,

.001, and not when it was low, $r = .17$, $p < .10$, a moderated regression analysis revealed that these coefficients did not differ.

CUED ARGUMENT RECALL

Participants recalled proportionately more weak arguments than strong arguments ($M_s = .66$ and $.52$, respectively), $F(1, 175) = 29.21$, $p < .0001$, and there were no other effects. As expected, recall of message arguments did not reliably predict attitudes.

Discussion

In Experiment 2, the experimental instructions to think in a positive way about a persuasive message were again shown to impact persuasion in a positively biased manner, such that strong arguments were equally persuasive for undirected and directed participants, but weak arguments were more persuasive for the directed versus the undirected group. The parallel reverse pattern occurred for the negatively directed group: The experimental instructions to think in a negative way about a persuasive message were shown to impact persuasion in a negatively biased manner, such that weak arguments were equally persuasive for undirected and directed participants but strong arguments were less persuasive for the directed versus the undirected group. Further, indexes of cognitive responding were strongly correlated with attitudes, providing correlational evidence that CRs mediate attitude change.

Certain methodological features of Experiment 2 minimize some doubts raised by Experiment 1. Our addition of a negative-directed-thinking group allowed us to see whether results mirrored those of the positive-directed-thinking group (they did). We also added an experimental manipulation of extent of processing, ORI with the issue, and showed that the cognitive responding results generalized across both low and high levels of this variable. The fact that there were no interactions with gender in this study suggests that our obtained results generalize across the sexes (Experiment 1 employed only female participants). Finally, employing counterattitudinal messages in Experiment 2 enabled us to document that the effects of the directed-thought manipulation are not limited to proattitudinal message positions.

GENERAL DISCUSSION

The two experiments described in this article document clear evidence that incidental influences on the evaluative direction of the message recipients' thoughts strongly impact their level of agreement with the message. This finding is consistent with fact that although we directed the valence of our respondents' thoughts, the actual content of the thoughts was entirely the production of the respondents. In both studies, the instructions

to process using a particular processing goal attenuated or eliminated the influence of argument quality much as past studies have correlationally shown particular variables to induce biased systematic processing. Whereas previous research testing a priori hypotheses of biased processing has resulted in mixed evidence and has demonstrated support of such hypotheses only for ambiguous arguments at relatively high levels of elaboration, use of the directed-thought technique allows for a priori predictions of biased processing in response to an experimental manipulation, across both high- and low-elaboration conditions and with clearly strong and clearly weak arguments.

Evidence of Biased Systematic Processing

Predictions of biased processing in the directed-CR conditions received substantial support across both experiments. Participants within both directed conditions were equally persuaded by strong and weak messages. Although undirected participants' attitudes aligned markedly with the strength of the arguments they were given, positively directed participants were equally persuaded by the strong message, and the negatively directed participants were equally persuaded by the weak message. The lack of an argument-quality effect has been suggested as evidence that message recipients were unable or unmotivated to process (e.g., Petty & Cacioppo, 1986). However, relatively biased processing can result in a pattern that appears to suggest no argument-quality effect, especially when a comparison (control) group is used that is maximally processing the arguments in an unbiased manner (e.g., high involvement; see Petty & Cacioppo, 1986, p. 46). The degree of persuasion resulting from strong arguments in the control, undirected conditions is probably maximal because of relatively unbiased systematic processing. As we predicted, in Experiment 2, when our positive bias treatment (favorable CRs) was compared with our high-elaboration control group, the positive bias effect was masked for the strong arguments (i.e., a ceiling effect was in operation); however, with weak arguments, the positive bias was more evident, resulting in a pattern that resembles one of no argument-quality effect.

The opposite also held true for the negative bias treatment in Experiment 2: Compared with the high-elaboration control group, the effect of the negative bias on weak arguments is masked in the negative-treatment condition (unfavorable CRs), but with strong arguments, the negative bias is more apparent. Thus, the pattern reported in Experiment 2 is precisely consistent with our biased processing hypothesis. Moreover, the pattern of results for the positive-CR condition in Experiment 2 matches the findings reported in Experiment 1 (see Figure 1). Further, in Experiment 2, examination of

the simple effects of argument quality on recalled CRs for each of the directed conditions revealed that there was no argument-quality effect within each directed condition. However, providing convincing convergent evidence of biased systematic processing, both groups rated the strong arguments as having higher argument quality than weak arguments ($p < .0001$).

Mediational Considerations

Our directed participants' recalled-thoughts indexes were strongly related to attitudes, and their directed-thoughts indexes were moderately related to attitudes, which is consistent with the conclusion that participants systematically processed message arguments. Moreover, the strong correlations we obtained in Experiment 2 between attitudes and participants' recalled CRs are predicted by the CR model and offer substantial support for the conclusion that attitude change is directly mediated by the valence of CRs (e.g., Brock, 1967; Cacioppo & Petty, 1979; Greenwald, 1968, 1981; Petty et al., 1976). Together, these findings clarify the ambiguous result in Experiment 1: We were unable to assert that our directed participants had systematically processed the arguments (in the biased manner described for Experiment 2) because participants' indexes of directed cognitive responding were not predictive of attitudes. The lack of a significant positive association led us to posit that participants may have used the directions to think positively either as a heuristic cue or to respond in a socially desirable manner, either of which could have led to similar levels of persuasion for strong and weak arguments. However, the results of Experiment 2 strongly support a biased systematic processing interpretation.

One alternative interpretation of our results is that participants used their attitudes to justify their initial thoughts, and although we acknowledge the possibility that participants used the instructions to concentrate on positive or negative thoughts as a cue to assert positive or negative attitudes, three features of our research offer disconfirming evidence. First, the pattern of recalled thoughts (listed following the message and thus more analogous to traditional thought-listing measures than our directed-thoughts measure) corresponds to that of attitudes; moreover, the significant associations between the recalled-thoughts index and attitudes in Experiment 2 ($r = .59, p < .0001$), which also hold in each condition ($r = .47 \leq .68, p < .001$), suggest that respondents did in fact process the message in a biased manner that corresponded to their attitudes. Further, our finding that the positively directed respondents' recalled thoughts were less favorable than those initially listed following the directed-thought instructions and that the negatively directed respondents' recalled thoughts were more fa-

vorable than their initial thoughts suggests that our directed groups did follow the instructions to list either positive or negative thoughts but that after reading the message, they recalled some counter-CR-instructions thoughts, and these ended up influential in determining attitude (as suggested by the stronger correlations between recalled thoughts and attitudes noted above). In other words, they appear to have followed the instructions to recall any thoughts and, therefore, did not restrict themselves to positive or negative thoughts but, rather, listed any that they recalled as coming to mind while reading the message. Taken together, the stronger relation between recalled thoughts and attitudes compared with initial thoughts, and the adjustment evident in the recalled-thoughts indexes strongly indicate that our participants were not simply responding to experimental demands.

Second, participants were able to differentiate the strong and weak arguments, even as they were equally persuaded by them in the positive- and negative-thought conditions. Moreover, participants wrote more positive thoughts in response to strong versus weak arguments in the positive-CR condition (Experiment 2), and this pattern was reversed in the negative-CR condition. Clearly, although the participants followed the instructions to list valenced thoughts, these thoughts were influenced by the quality of arguments. Finally, the reverse feedback loop, which posits that participants used their attitudes to justify their initial thoughts, might be interpreted not as an experimental demand but, rather, as a simple psychological heuristic (e.g., Chaiken & Maheswaran, 1994). To support such an interpretation of our results (Experiment 2), there should have been evidence of a tendency for attitudes to follow the directed-thought instructions more in the low- than in the high-ORI conditions. However, such evidence is entirely absent from our attitude data. Thus, the data are strongly congenial to a biased systematic processing interpretation.

In Experiment 2, there were clear indications of the success of the involvement manipulation, with participants in the high-ORI group reporting more involvement and greater effort expended reading and evaluating the message than the low-ORI group. Also, the almost but not quite significant trend ($p = .0535$) for the interaction between argument quality and involvement on persuasion parallels that of prior studies (e.g., Petty & Cacioppo, 1979, Experiment 2; for reviews, see Johnson & Eagly, 1989, 1990; Petty & Cacioppo, 1990). That is, the tendency for strong arguments to be more persuasive than weak arguments was much larger for high- than for low-ORI participants. Thus, there is little doubt that involvement was operationalized successfully. The fact, therefore, that ORI did not interact with the directed-

thought manipulation is important: The incidental effects of directed thought were not undermined by increasing message elaboration. This finding is provocative in that ORI has been thought to promote relatively open-minded, accurate message processing (e.g., Johnson & Eagly, 1989; Petty & Cacioppo, 1990). Instead, it appears relatively easy to undermine and bias the processing of highly involved message recipients (see Johnson, 1994; Johnson & Eagly, 1990).

A reexamination of the mean ratings of involvement and effort for the low- versus high-involvement groups ($M_s = 5.03$ and 5.90 , respectively, on a 9-point scale) suggests a moderate, rather than a low, level of involvement for the low group—that is, the directions to think and list thoughts may have motivated participants to attend to the message more carefully, regardless of the overt manipulation of involvement, resulting in moderate rather than low involvement. And, as has been previously established empirically, as ORI increases, systematic processing increases (see Johnson, 1994; Petty & Cacioppo, 1986). Maheswaran and Chaiken (1991) suggested that systematic and heuristic processing can combine to produce additive effects on persuasion. When message recipients are not highly motivated to process arguments, they often rely on heuristic cues. However, if the heuristic cue is incongruent with a minimal understanding of message content, participants ought to be motivated to search for further information, including closer inspection of the message arguments themselves, to reach an acceptable level of judgmental confidence (e.g., Baker & Petty, 1994). If so, parallel effects ought to appear for the low-involvement conditions of our Experiment 2. Thus, when positive-CR participants read weak arguments, or when our negative-CR participants read strong arguments, recall of message arguments should have increased relative to the respective strong- and weak-arguments conditions. However, none of these patterns were observed. Thus, it appears that the simpler explanation for our low-involvement participants' persuasion pattern holds: They, like their high-involvement counterparts, used biased systematic processing to reach their eventual attitudes on the issue.

Another way to clarify the validity of the different routes taken by the low- versus high-ORI participants is to examine the CRs of the low-involvement participants in comparison with those of the high-involvement participants. The favorability of CRs and their predictive relation to attitudes can be used as indicators of the extent of systematic processing (see Eagly & Chaiken, 1993; Petty & Cacioppo, 1986). Briefly, compared with participants who are not motivated (e.g., low-ORI), participants who are motivated to evaluate a message (e.g., high-ORI) produce CRs that are more favorable in response to strong arguments and less favorable in re-

sponse to weak arguments (e.g., Cacioppo et al., 1981; Petty, Harkins, & Williams, 1980). Also, correlations between CRs and attitudes are reported to be high when the message is personally relevant to the participants but lower when the message is not relevant (see Cacioppo & Petty, 1981; Petty & Cacioppo, 1979). As reported for Experiment 2, there was a trend ($p < .06$) for involved participants to list more favorable thoughts in response to strong arguments and more unfavorable thoughts in response to weak arguments compared with uninvolved participants. Further, the recalled-CR indexes of the involved participants were reliably more predictive of attitudes than were the indexes of the uninvolved participants. However, in all conditions, participants' thought indexes were reliably related to attitudes. Overall, then, these results seem again to favor a biased systematic processing explanation for the low- as well as the high-ORI participants.

Summary and Directions for Future Research

We have documented strong evidence that instructions to think in a positive or negative way about a message result in biased processing of message content. The directions to think in a positive or negative way overwhelmed the effect of the quality of the message, even when involvement was high: Participants directed to think positively agreed more even with weak arguments, and those directed to think negatively agreed less even with strong arguments. Thus, incidental influences on the evaluative direction of the message recipients' thoughts strongly impacted their level of agreement with the message, even when ORI was high.

The directed-thought technique represents an advance in researchers' abilities to examine biases in message processing. In much of the previous research, biases have been inferred only post hoc from the patterns appearing in researchers' data. For example, Wood et al. (1985) interpreted their knowledge and persuasion data after the fact for signs of biased processing. Similarly, Petty and Cacioppo (e.g., 1986) premised their discussion of biased and other forms of processing on this kind of post hoc comparison procedure. "Our empirical method of defining argument quality," they wrote, "allows us to assess the extent to which a variable affects argument processing and the extent to which this processing is relatively objective or relatively biased" (p. 40). To determine if processing has been relatively biased, one need only consult Petty and Cacioppo's figures: "If the interaction *follows the form depicted* in panel IV of [the] Figure . . . it suggests that the effect of the variable on information processing is relatively biased" (p. 43, emphasis added). Eagly and Chaiken (1993) concur: "It is the match between observed persuasion data and the ideal ELM patterns that Petty and Cacioppo (1986, 1990)

have emphasized in testing the viability of their model" (p. 314).

However, as discussed in our introduction, more recent research has tested a priori hypotheses of biased processing, examining the role of positive mood (Petty et al., 1993) and heuristic cues as biasing factors (Chaiken & Maheswaran, 1994). Both studies predicted biased processing would occur only (a) under more than minimal levels of cognitive elaboration of message arguments and (b) with ambiguous messages. Moreover, Petty et al. (1993) felt unable to confidently claim success for the tests of their hypotheses because the interaction patterns did not match the ideal ELM patterns discussed above (Petty & Cacioppo, 1986). Moreover, they wondered whether the argument-quality manipulation might not be a useful practical cue in testing biased processing hypotheses. Chaiken and Maheswaran (1994), in addition to providing evidence that the heuristic cue of source credibility does bias systematic processing of ambiguous arguments, also demonstrated no bias in their unambiguous-message conditions.

In contrast to this research, we were able to demonstrate that the processing goal initiated by our directed-thoughts instructions biases processing in high- and low-elaboration conditions with clearly strong and clearly weak messages. Thus, the directed-thought technique offers an experimental, proactive way to examine such biased processing effects. One provocative direction for the use of this technique is to examine whether an initially strong negative attitude toward an issue (i.e., a negative bias) could be overwhelmed by the presentation of strong arguments under the instructions to report only positive CRs. In other words, the technique offers some hope of starting to understand the circumstances under which biases can be overcome. Related research might usefully investigate the boundary conditions under which the directed-thought technique is able to overcome positive or negative biases.

Although Petty, Cacioppo, and colleagues (e.g., Petty, Ostrom, & Brock, 1981) have discussed other aspects of CRs, such as recipient generated and recipient modified (e.g., Petty, 1981), they have focused almost exclusively on message-relevant cognitions in their empirical studies. Other researchers, however, have used the thought-listing paradigm to investigate still other components of participants' CRs, such as source derogations and affirmations (Mackie, 1987) and self-relevant versus non-self-relevant cognitions (Shavitt & Brock, 1986). Although in the two experiments reported above we concentrated our efforts on directing the favorability of message-relevant cognitions, it is plausible that future research could successfully employ the directed-thought technique to these other dimensions as well.

NOTES

1. Also suggesting a role for CRs in persuasion, Tesser (e.g., 1978) showed that when instructed to think about one's attitudes, one's attitudes tend to polarize in the direction that attitudes were initially. However, this finding is in the absence (a) of an instruction to think in a particular direction and (b) of a message.

2. Following an open sign-up procedure, 64 females and 6 males participated in the experiment. The data from the males were discarded to homogenize the participant pool. Of the remaining female participants, 8 in the undirected condition and 7 in the directed condition failed to write any thoughts on the brochure in response to the directed-thoughts instructions, and these data were subsequently discarded. Some participants responded to the instructions by underlining sentences or sentence fragments; these were counted as thoughts but were not coded for valence. The patterns reported in the study were not altered when the data from the discarded participants were included in analyses.

3. Participants in both conditions rated themselves as equally confident in their opinions, $M_s = 7.92$ and 7.96 , and there were no effects of argument quality on this variable.

4. In the pilot study, 38 participants rated the 24 arguments used by Petty, Harkins, and Williams (1980) along one of three dimensions, *valence*, *likelihood*, or *perceived strength*. Because the majority of existing persuasion literature is based on arguments that have evidently manipulated valence (Areni & Lutz, 1988; Eagly & Chaiken, 1993), the valence and perceived ratings elicited in the pilot study were used to choose strong and weak arguments for use in Experiment 2. The 6 arguments that were rated in the top 8 in both valence and perceived strength constituted the strong arguments; those 6 rated in the bottom 8 constituted the weak arguments.

5. Two participants included in the main analyses did not indicate their sex. Further, data from 15 participants in the positive-CR condition and 16 participants in the negative-CR conditions who failed to follow the instructions to list thoughts in the margins of the message were removed from the analyses. The inclusion of the discarded data did not alter the essential pattern of the results.

6. Participants in Experiment 2 were asked to indicate if they were members of the classes that participated as participants in either Experiment 1 or the pilot study; there were none.

7. A random sample of participants' recalled thoughts were coded as positive, neutral, or negative by a judge blind to the hypotheses and participants' condition. The number of positive and negative thoughts were strongly associated to our index ($r_s = .85$ and $-.78$, respectively), and thus strongly align with the typical patterns reported in the literature.

8. Some participants indicated their reactions to the message by underlining sentences and sentence fragments. These were coded as thoughts but were not coded for valence.

9. No effects of sex of participant appeared, and this factor was subsequently removed from the analyses.

10. It is understandable that argument quality affected involvement because a message proposal that seems reasonable (strong) is more applicable to the recipients' lives, whereas those that are unreasonable (weak) seem relatively inapplicable. Similarly, a message proposal supported by strong arguments might seem more likely to be implemented than one that is supported by only weak arguments. This argument-quality effect is unlikely to be a concern to the reported results, because statistically controlling for the involvement rating and its interactions with the manipulations left the reported patterns of attitudes results intact.

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