Heuristic Processing Can Bias Systematic Processing: Effects of Source Credibility, Argument Ambiguity, and Task Importance on Attitude Judgment

Shelly Chaiken and Durairaj Maheswaran

High- and low-task-importance Ss read a strong or weak unambiguous message or an ambiguous message that was attributed to a high- or low-credibility source. Under low task importance, heuristic processing of the credibility cue was the sole determinant of Ss' attitudes, regardless of argument ambiguity or strength. When task importance was high and message content was unambiguous, systematic processing alone determined attitudes when this content contradicted the validity of the credibility heuristic; when message content did not contradict this heuristic, systematic and heuristic processing determined attitudes independently. Finally, when task importance was high and message content was ambiguous, heuristic and systematic processing again both influenced attitudes. Yet, source credibility affected persuasion partly through its impact on the valence of systematic processing, confirming that heuristic processing can bias systematic processing when evidence is ambiguous. Implications for persuasion and other social judgment phenomena are discussed.

The heuristic–systematic model (Chaiken, 1980, 1987; Chaiken, Liberman, & Eagly, 1989) and the elaboration likelihood model (Petty & Cacioppo, 1981, 1986) differentiate systematic (or central route) processing from heuristic (or peripheral route) processing. Applied to persuasion, the focus of the present research, systematic processing implies that people have formed or updated their attitudes by actively attending to and cognitively elaborating persuasive argumentation. In contrast, heuristic processing implies that people have formed or changed their attitudes by invoking heuristics such as "experts can be trusted," "majority opinion is correct," and "long messages are valid messages."¹

These dual-process theories regard systematic processing as more effortful and capacity limited than heuristic processing. They therefore assume that heuristic processing predominates when motivation or capacity for effortful processing is low; for example, when the issue or one's judgment is inconsequential (e.g., Chaiken, 1980) or when time does not permit extensive information processing (e.g., Ratneshwar & Chaiken, 1991). Consistent with these assumptions, numerous experiments have shown that the attitude judgments of low-motivation or low-capacity subjects are influenced very little by the caliber of a message's persuasive arguments but are influenced quite substantially by heuristic cues such as source credibility, other people's opinions, or the sheer length of a message. Likewise, these and other studies have supported these theories' assumption that the quality of persuasive arguments, and subjects' cognitive responses to them, exert a pronounced attitudinal impact when motivation and capacity for systematic processing are relatively high (see Eagly & Chaiken, 1993, for review). Of greater interest here, heuristic cues appear to have little influence on attitudes in such circumstances. In fact, the typical (analysis of variance [ANOVA]) result is that heuristic cues exert no detectable persuasive impact when systematic processing is appreciable (e.g., Axson, Yates, & Chaiken, 1987; Chaiken, 1980; Petty & Cacioppo, 1984a; Petty, Cacioppo, & Goldman, 1981; Wood, Kallgren, & Preiser, 1985).

Why would heuristic cues not affect judgment when people process systematically? One possibility is that heuristic and systematic processing are mutually exclusive; in particular, maybe systematic processing suppresses the occurrence of heuristic processing. Although reasonable, our theory assumes that heuristic processing can co-occur with systematic processing. This assumption implies that the two modes of processing can exert independent or interdependent effects on judgment, depending on a number of mutable factors (Chaiken et al., 1989).²

¹ Although the two models share similar conceptions of systematic processing/central route persuasion, peripheral route persuasion includes, but is not restricted to, heuristic processing; it refers to any attitude formation or change mechanism that causes persuasion in the absence of argument scrutiny (e.g., operant and classical conditioning or identification-based attitude change). Additional similarities and differences between the two models are relevant to the current article are discussed in subsequent footnotes or in the text. For a detailed review of these models, see Eagly and Chaiken (1993).

² Heuristic processing is assumed to co-occur with systematic processing so long as heuristic cues are present in the judgment setting and...
We have argued that the negligible impact of heuristic cues when people process systematically stems from the fact that systematic processing often attenuates the judgmental impact of heuristic processing. More specifically, our model assumes that systematic processing typically provides perceivers with more judgment-relevant information than heuristic processing and, in some instances, with information that may contradict heuristic-based judgments. As a consequence, and in line with averaging models of judgment (e.g., Anderson, 1981), the impact of heuristic cues would often be negligible in settings that promote systematic processing (Chaiken et al., 1989).

This reasoning suggests that attenuation should be most evident when information furnished by systematic processing is ample and undermines the validity of heuristic-based inferences. When the information yielded by systematic processing does not contradict (or overwhelm) that provided by heuristic processing, judgment is more likely to reflect the impact of both processing modes. Moreover, the model's additivity and bias hypotheses describe two ways in which heuristic processing can impact on judgment when it co-occurs with systematic processing. According to the additivity hypothesis, heuristic processing could exert a direct impact on judgment in such circumstances, independent of the impact of systematic processing.

Evidence for additivity and attenuation was obtained by Maheswaran and Chaiken (1991) and Maheswaran, Mackie, and Chaiken (1992). The multifactor designs of most persuasion tests of the heuristic–systematic and elaboration likelihood models have included conditions in which message content contradicts the validity of heuristic-based inferences; for example, expert sources or lengthy messages present weak arguments (e.g., Petty & Cacioppo, 1984a; Petty et al., 1981; Wood & Kallgren, 1988; Wood et al., 1985). Such designs increase the probability that ANOVA tests of the persuasive impact of heuristic cues will be nonsignificant in circumstances that favor substantial systematic processing—a nonfinding indicative of attenuation (see Chaiken et al., 1989). Adopting a supplementary analytic strategy, Maheswaran and Chaiken (1991) and Maheswaran et al. (1992) regressed their high-motivation subjects' attitude judgments on an indicator of systematic processing, an indicator of heuristic processing, and these predictors' interactions with a dichotomous congruency variable. The latter differentiated cue–message combinations were contradictory (e.g., positive consensus cue–negative message content) from those that were not (e.g., positive consensus cue–positive message content). These analyses showed that attitudes were mediated by systematic processing alone in these experiments' incongruent conditions (attenuation) but by both systematic and heuristic processing in their congruent conditions (additivity).

The additivity hypothesis emphasizes the independence of heuristic and systematic processing in its assertion that heuristic processing can impact directly on judgment when it co-occurs with systematic processing. Our model's bias hypothesis emphasizes the interdependence of these processing modes. It asserts that heuristic processing may sometimes influence judgment indirectly by biasing the valence of systematic processing. The basis for this hypothesis is the recognition that heuristic processing produces inferences or expectancies about the probable validity of persuasive messages or the probable nature of attitude objects (Chaiken et al., 1989; Maheswaran & Chaiken, 1991). For example, heuristic processing would lead people to expect messages to contain more valid arguments when they stem from expert rather than nonexpert sources and to expect attitude objects or attitudinal positions to be more worthy when they are liked or endorsed by many rather than few people. Because heuristic cues influence people's expectations about the probable validity of persuasive messages or the probable nature of attitude objects and issues, they should also function to bias people's perceptions and evaluations of the arguments contained in persuasive messages or, more generally, of "individualizing" information about attitude objects. Thus, if a message is delivered by an expert, its arguments may be perceived as stronger and elaborated on more positively than when the message is delivered by a nonexpert. Similarly, if majority opinion favors a message's advocated position, systematic processing of its content may be positively biased relative to when consensus opposes the message's position.

Systematic processing may be biased by a variety of cognitive and motivational factors (see the discussion section). The biasing effect of heuristic processing represents a cognitive source of bias and is postulated to occur mainly when persuasive argumentation (or other individuating information) is amenable to differential interpretation as a function of the expectancies established by people's processing of heuristic cues (Chaiken et al., 1989). In other words, such information must be relatively ambiguous. It is therefore not surprising that little evidence for our bias hypothesis can be found in past persuasion research (but see footnote 11). Although ambiguous stimuli have figured prominently in demonstrations that stereotypes and activated (i.e., primed) trait constructs can bias person perception (see Higgins & Bargh, 1987), the messages used in persuasion research almost always consist of clear, unambiguously strong or weak arguments. The use of such stimuli should reduce the likelihood that heuristic processing will bias systematic processing and increase the likelihood of attenuation or additivity, depending on the amount and nature of information that systematic processing yields (see earlier discussion).

Mackie (1987, Study 1) did use an arguably ambiguous message and obtained findings compatible with our bias hypothesis. She presented subjects with strong arguments on both sides of the issue of ensuring a military balance in the Western Hemisphere. The arguments on one side of the issue were allegedly endorsed by a majority of subjects' peers, and the arguments on the other side by a minority. Subjects agreed more with the
majority's position and expressed more favorable thoughts about their arguments, suggesting that biased systematic processing had mediated agreement. We assume that this study's message was somewhat ambiguous insofar as it presented subjects with a mix of pro and con arguments on an unfamiliar issue (familiarity, per se, is addressed in the Discussion section).

As a consequence, subjects' heuristic processing of consensus information may have led them to expect the majority's (vs. minority's) arguments to be better, and this expectation may have led them to more favorably perceive and elaborate those arguments and therefore to be more persuaded by them.

Although compatible with our bias hypothesis, Mackie's (1987) data can be interpreted in alternate terms. Moreover, her data are uninformative with respect to our assumption that heuristic processing biases systematic processing mainly when message content is ambiguous. To provide an explicit test of our hypothesis and its boundary conditions, we conducted a study that manipulated a heuristic cue, message ambiguity, and amount of systematic processing.

Heuristic processing can bias systematic processing only if the latter occurs in more than marginal amounts. We therefore first manipulated motivation for systematic processing by leading some subjects to believe that their processing task was important and others to believe that their task was unimportant. This induction was expected to motivate systematic processing by increasing subjects' concerns about forming accurate attitude judgments (Chaiken et al., 1989). The heuristic cue we manipulated was source credibility: Some subjects were led to believe that the source lacked credibility. After exposure to these manipulations some subjects read an unambiguous message that contained either (predominantly) strong arguments or (predominantly) weak arguments, and other subjects read an ambiguous message composed of a (more balanced) mix of strong and weak arguments. All three messages asserted that a particular telephone answering machine was superior to (or inferior to) competing brands. Such valence discrepancies are absent in the current design—our messages uniformly assert the XT-100's superiority over other brands, and through these messages, the high- and low-credibility sources both endorse this product. The present level of cue-message incongruency is thus far less extreme and also focuses more narrowly on whether the quality of persuasive argumentation (strong vs. weak) reinforces or belies the validity of the heuristic that credible (incredible) communicators' statements are valid (invalid). Similarly, incongruency in the Maheswaran et al. experiment was created by presenting subjects with a message whose arguments reinforced (strong) or undermined (weak) the validity of the heuristic that products bearing a highly regarded brand name are of higher quality than those bearing an unfamiliar brand name. In line with the current predictions, cue-message incongruency did not enhance systematic processing in that study.

Our prime interest concerns the ambiguous message conditions. Here the heuristic cue of source credibility was expected to influence subjects' attitudes regardless of whether they engaged in marginal or substantial amounts of systematic processing. However, this cue was expected to exert a direct, heuristic impact on attitudes under low task importance and an indirect impact, mediated by biased systematic processing, under high task importance.

Method

Subjects

Three hundred sixty-seven New York University undergraduates received extra course credit for participating in the experiment. They participated in small group sessions and were randomly assigned to the experimental conditions.

Procedure

Subjects were told that they would read and give their opinions about a new telephone answering machine, the "XT-100." They then read a 4-page booklet that conveyed the task importance, source credibility, and message type manipulations. A questionnaire that assessed subjects' at-

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3 According to the alternative explanation put forth by Mackie (1987), subjects' group-identity needs may have fostered a sense of commitment to the majority's position that motivated them to defend its validity by preferentially attending to and evaluating their arguments (see Chaiken et al.'s, 1989, discussion of defense-motivated systematic processing). Other motivational factors that may bias systematic processing are addressed in the Discussion section.
titudes and other dependent measures followed. After an open-ended suspicion probe, subjects were debriefed.

Independent Variables

Task importance. Page 1 of the experimental booklet manipulated accuracy motivation by varying the importance and personal relevance of subjects’ decision task. High-task-importance subjects were told that the XT-100’s manufacturer was surveying small samples of New Yorkers to decide whether to distribute the product in their area. They were also told that their opinions would weigh heavily in this decision. Low-task-importance subjects learned instead that the manufacturer was surveying large samples of New Yorkers as a means of exploring the possibility of marketing the product in the Midwest. They were also told that their individual opinions were unimportant because they would be averaged with those of many other respondents.

Source credibility. Page 2 of the booklet described the source of the “product description” that subjects were to read. In the high-credibility condition subjects were told that the description was excerpted from Consumer Reports, a magazine specializing in the scientific testing of new products. In the low-credibility condition subjects learned that the description was excerpted from a promotional pamphlet prepared by the sales staff of Kmart, a discount retail chain.

Message type. Booklet Pages 3 and 4 contained the product description. This approximately 470-word message compared the XT-100 with two competing brands on six product attributes and, at its beginning and end, asserted that the XT-100 was superior to those brands. The six attributes were selected from a set of four important and four unimportant features of telephone answering machines that we identified in a pretest (see Table 1). By varying the balance of important and unimportant attributes discussed in conjunction with the number of attribute comparisons that portrayed the XT-100 as superior to its competition, and through slight variations in wording, we constructed an unambiguous strong message, an unambiguous weak message, and two renditions of an ambiguous message.

As shown in Table 1, the unambiguous strong message portrayed the XT-100 as superior to its competition on four important attributes and inferior on two unimportant ones. Type of comparison was thus purposefully conflated with attribute importance. The “superior-than” comparisons appeared as Arguments 1, 2, 4, and 5 of this message, and the “inferior-than” comparisons appeared as Arguments 3 and 6. For example, the arguments based on call screening, cassette flexibility, and colors stated,

The XT-100 offers the very important advantage of screening your calls before you decide to answer the phone. XT-100 allows you to listen to the caller before answering. One can thus avoid unwanted calls and interruptions. If you choose to answer, you just pick up the phone. This call screening feature was not available in either the AT&T 2500 or Uniden Ex 9500 answering machines.

The XT-100 makes use of standard cassette tapes that are interchangeable with readily available commercial tapes. However, AT&T 2500 and Uniden Ex 9500 use custom built cassette tapes which are specially designed micro cassettes available only through their distributors. Standard or prerecorded commercial tapes cannot be used with these machines.

The XT-100 is available in different colors to suit the needs of most in-home and office requirements. AT&T 2500 and Uniden Ex 9500 may have a slight but not very important advantage of offering twelve different color schemes.

Like the strong message, the unambiguous weak message also portrayed the XT-100 as superior to its competition on four attributes (Arguments 1, 2, 4, and 5) and inferior on only two (Arguments 3 and 6). Yet the weak message’s superior-than arguments concerned unimportant attributes and its inferior-than arguments concerned important ones (see Table 1). In writing this message no attempt was made to minimize the importance of important attributes (e.g., “The XT-100 does not have a provision for call screening. However, AT&T 2500 and Uniden Ex 9500 offer the very important advantage of screening your calls”). We did, however, avoid language impugning the importance of unimportant attributes. For example, this message’s colors and specialty bolts arguments stated

The XT-100 is available in twelve different colors to suit the needs of most in-home and office requirements. AT&T 2500 and Uniden Ex 9500 are available in only eight different color schemes.

The XT-100 is self-contained and comes with two specialty bolts which can be used to mount the unit on the wall. AT&T 2500 and Uniden Ex 9500 can also be mounted on the wall. However, the manufacturers do not provide the specialty bolts with the answering machine.

Methodological reasons dictated that we create two (conceptually identical) renditions of an ambiguous message. Both contained three superior-than and three inferior-than attribute comparisons, and type of comparison was purposefully made to be uncorrelated with attribute importance. As shown in Table 1, one rendition was yoked to the strong message insofar as it discussed the same set of attributes. It thus portrayed the XT-100 as better than its competitors on one unimportant and two important attributes (Arguments 6, 1, and 4) and worse than its competitors on one unimportant and two important attributes (Arguments 3, 2, and 5). The second rendition featured the (somewhat different mix of) attributes discussed in the weak message. Thus, it portrayed the XT-100 as superior on one important and two unimportant attributes (Arguments 3, 2, and 6) and inferior on one important and two unimportant attributes (Arguments 5, 1, and 4).

### Table 1

**Attributes and Valence of Attribute-Comparison (+ Vs. −)**

*Used to Construct the Unambiguous Strong (US), Unambiguous Weak (UW), and Two Ambiguous Messages (A1 and A2)*

<table>
<thead>
<tr>
<th>Attribute</th>
<th>US</th>
<th>UW</th>
<th>A1</th>
<th>A2</th>
</tr>
</thead>
<tbody>
<tr>
<td>Important attributes</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Cassette flexibility</td>
<td>+</td>
<td>−</td>
<td>−</td>
<td>−</td>
</tr>
<tr>
<td>Message retrieval</td>
<td>+</td>
<td>−</td>
<td>+</td>
<td>−</td>
</tr>
<tr>
<td>Call screening</td>
<td>+</td>
<td>−</td>
<td>−</td>
<td>+</td>
</tr>
<tr>
<td>Personal memo</td>
<td>+</td>
<td>−</td>
<td>+</td>
<td>−</td>
</tr>
<tr>
<td>Unimportant attributes</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Number of colors</td>
<td>−</td>
<td>+</td>
<td>+</td>
<td>+</td>
</tr>
<tr>
<td>Number of phone lines</td>
<td>−</td>
<td>+</td>
<td>−</td>
<td>−</td>
</tr>
<tr>
<td>Number of sizes</td>
<td>+</td>
<td>+</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Specialty bolts</td>
<td>+</td>
<td>−</td>
<td></td>
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</tbody>
</table>

**Note.** Entries signify that attribute was used in a particular message and that the attribute comparison portrayed the XT-100 as superior (+) or inferior (−) to its competitors. Mean pretest importance ratings on a −4 to 4 scale ranged from 2.7 to 3.8 for the four important attributes and from −1.1 to 0.6 for the four unimportant attributes (see the Method section for order in which attribute comparisons appeared in each message).
To further enhance the ambiguity of these messages and to bolster the plausibility of their assertion that the XT-100 was the superior brand, we also included in each rendition an occasional phrase that mildly derogated the importance of several (but not all) attributes on which the XT-100 was acknowledged to be inferior to its competition. For example, Rendition 1 characterized the XT-100’s inferiority on call screening as “a minor inconvenience” and its color disadvantage as “not very important.”

**Dependent Variables**

Subjects responded to our measures in the order described below. Unless otherwise stated, they made their responses on 9-point scales anchored by −4 and 4.

**Attributes.** Subjects rated the extent to which they would consider buying the XT-100, their favorability toward it, and the extent to which they regarded it as a useful and good product. Responses to these items were averaged to form one attitude index (coefficient α = .94).

**Cognitive responses.** Subjects were given 3 min to list their thoughts about the product or product description. Two independent raters subsequently categorized these thoughts as attribute related (A) or source related (S) and as expressing positive (+), negative (−), or neutral (0) evaluation toward the XT-100. Interrater agreement was 90%, and discrepancies were resolved through discussion. The following thoughts illustrate this coding scheme: “The XT-100's beeperless retrieval is necessary” (A+); “XT-100 doesn’t have call screening” (A−); “What is its price?” (AO); “Consumer Reports magazine is reliable” (S+); “Kmart sells inferior products” (S−); and “Consumer Reports is available in the library” (S0).

The number of thoughts in each category was recorded for each subject and used to calculate four index scores: amount of attribute-related thinking (A+ + A− + A0), valence of attribute-related thinking (A+ − A−), amount of source-related thinking (S+ + S− + S0), and valence of source-related thinking (S+ − S−).

**Manipulation checks.** Subjects rated their motivation to read the product description on two scales: not (vs. highly) interested and not (vs. highly) involved; responses to these items were averaged to form one task involvement index (r = .74). Perceptions of the source were assessed on four scales: credible (vs. noncredible), reliable (vs. unreliable), trustworthy (vs. untrustworthy), and expert (vs. inexpert); responses to these were averaged to form one source credibility index (α = .94). Finally, subjects rated the extent to which the product description portrayed the XT-100 as having many (vs. few) positive features; few (vs. many) negative features, and as superior (vs. inferior) to competing brands; responses to these items were averaged to form one message favorability index (α = .82).

**Argument recall.** Subjects were asked to write down all they could remember from the product description. Two independent raters (r = .91) later scored these responses for gist recall of the message’s six arguments (i.e., attribute comparisons; scores ranged from 0 to 6).

**Results**

No subjects were suspicious, and preliminary analyses yielded no gender differences. Most important, these analyses confirmed that the two renditions of the ambiguous message yielded virtually identical effects on the manipulation checks and major dependent measures. The Task Importance X Source Credibility X Message Type ANOVAs reported below therefore feature only the theoretically important levels of the message type factor: unambiguous strong versus ambiguous versus unambiguous weak.

**Manipulation Checks**

**Task importance.** The ANOVA on the two-item task involvement index yielded only the expected task importance main effect, $F(1, 355) = 27.46, p < .001$. Subjects in the high-importance conditions expressed greater interest in reading the product description than subjects in the low-importance conditions ($M_{high} = 1.79$ vs. 1.05).

**Source credibility.** The only effect for the four-item credibility index was due to the source manipulation, $F(1, 355) = 84.83, p < .001$. As expected, subjects who believed that the product description had been prepared by Consumer Reports, as opposed to the Kmart sales staff, regarded the message source as possessing greater credibility ($M_{high} = 2.17$ vs. 0.74).

**Message type.** The three-item message favorability index yielded only a message type main effect, $F(2, 355) = 57.25, p < .001$. On this −4 to 4 index the mean for the ambiguous message condition was 1.91 ($M_{ambiguous weak} = 2.15$ and 1.69 for Renditions 1 and 2, respectively). In comparison, subjects’ perceptions that message content established the XT-100 as being a superior product were reliably more extreme in the unambiguous strong message condition ($M = 2.85$), $F(1, 355) = 114.04, p < .001$, and reliably less extreme in the unambiguous weak message condition ($M = 0.74$), $F(1, 355) = 46.54, p < .001$.

The fact that all three cell means are above zero confirms that subjects correctly perceived all three messages as favoring the XT-100 over its competitors. Yet the reliably divergent means for the unambiguous strong and weak messages corroborates our assumption that subjects would perceive these messages as offering particularly strong and particularly weak support for the alleged superiority of the XT-100. The more moderate mean for the ambiguous message supports our assumption that its content would be more ambiguous to subjects than the content of the unambiguous messages. Also consistent with this assumption, ratings of message favorability were more variable in the ambiguous message condition: The standard deviations for the unambiguous strong message (0.87) and the unambiguous weak message (1.07) were each reliably smaller ($p < .001$) than the standard deviation obtained for either rendition of the ambiguous message (1.76 and 1.62, respectively).

**Cognitive Responses and Argument Recall**

**Source-related thoughts.** Consistent with the check on the credibility manipulation, the valence of subjects’ source-related thoughts was more positive in the high- than low-credibility conditions ($M_{high} = 0.45$ vs. −0.53), $F(1, 355) = 133.52, p < .001$. In addition, source-related thinking grew more positive as message type changed from unambiguous weak to ambiguous weak.

4 Attribute-related thoughts included only cognitions pertaining to specific attributes of the XT-100 (call screening, etc.). Other thought categories, which yielded no reliable effects when analyzed, included general evaluations of the XT-100 (e.g., “XT-100 is a good machine”), peripheral comments about the experimental materials (e.g., “XT-100 will be marketed in NYC”), comments about answering machines in general (e.g., “Answering machines are impersonal”), and irrelevant thoughts (e.g., “I have a class after this experiment”).
unambiguous strong \((Ms = -0.24 \text{ vs. } -0.06 \text{ vs. } 0.18)\), \(F(2, 355) = 7.03, p < .01\). Disregarding valence, fewer source-related thoughts were expressed by high- (vs. low-) importance subjects \((Ms = 0.46 \text{ vs. } 0.86)\), \(F(1, 355) = 21.09, p < .001\). Also, the ambiguous and unambiguous weak messages tended to elicit more source-related thinking than the unambiguous strong message \((Ms = 0.81, 0.67, \text{ and } 0.49)\), \(F(2, 355) = 4.91, p < .01\).

**Amount of systematic processing.** In addition to its influence on subjects' self-reports of task involvement, the task-importance manipulation exerted its predicted impact on amount of systematic processing. Subjects in the high- compared with low-task-importance conditions expressed a greater number of attribute-related thoughts \((Ms = 3.05 \text{ vs. } 2.31)\), \(F(1, 355) = 16.98, p < .001\), and also recalled more persuasive arguments \((i.e., \text{ attribute comparisons; } Ms = 5.70 \text{ vs. } 4.99)\), \(F(1, 355) = 20.83, p < .001\). No other effects were reliable on these measures. Also as expected, analyses that focused on the unambiguous message conditions revealed no tendency for cue-undermining (vs. cue-reinforcing) messages to stimulate systematic processing among low- (or high-) importance subjects \((Fs < 1 \text{ for Message } \times \text{ Credibility and Message } \times \text{ Credibility } \times \text{ Importance interactions})\).

**Valence of systematic processing.** Message content exerted a strong impact on the valence of subjects' attribute-related thoughts, \(F(2, 355) = 54.34, p < .001\). Consistent with the manipulation check data, this valenced index of systematic processing revealed more favorable thinking about the XT-100 as message type changed from unambiguous weak to ambiguous to unambiguous strong. This tendency was reliable for low- and high-task-importance subjects \((ps < .001)\). Yet, consistent with the greater systematic processing observed for the latter group, the Task Importance \(\times\) Message Type interaction confirmed that message content exerted a more pronounced impact on valence of systematic processing in the high-importance conditions, \(F(2, 355) = 9.31, p < .001\). Means appear in Table 2.

Of greater interest, the ANOVA on these index scores also yielded a Task Importance \(\times\) Message Type \(\times\) Source Credibility interaction, \(F(2, 355) = 3.88, p < .05\) (the Importance \(\times\) Credibility interaction was also reliable at \(p < .05\), but is qualified by the three-way interaction). The stronger message type effect on the valence of high- (vs. low-) importance subjects’ systematic processing, noted above, held across both levels of source credibility. Of prime importance, tests for the simple effects of credibility within importance and message type conditions substantiated our hypothesis that heuristic processing of the source cue would bias the valence of systematic processing when message content was ambiguous and systematic processing was appreciable. As Table 2 shows, high-importance subjects who received an ambiguous message did think more favorably about the XT-100's attributes when the message source was highly credible, simple \(F(1, 355) = 26.20, p < .001\). However, in the high-importance, unambiguous message conditions, credibility had no impact on valence of systematic processing, simple \(F(1, 355) < 1.25 \text{ (weak) and } < 1 \text{ (strong). As we also expected, credibility had no influence on the valence of low-task-importance subjects' (marginal) systematic processing, alone or in interaction with message type (simple } F < 1)\).

Several aspects of our valenced index of systematic processing bolster our interpretation that high-importance, ambiguous message subjects' processing of persuasive argumentation was biased by the credibility cue. This index represented the net positivity of subjects' positive and negative cognitive responses to specific product attributes (see Footnote 4). Moreover, examination of the thought protocols revealed that all such responses pertained to the attributes featured in the messages' arguments (in contrast, 13% of all neutral attribute-related thoughts pertained to nondiscussed attributes). Finally, high-importance, ambiguous message subjects' thoughts revealed numerous examples of credibility-induced biased evaluation. In particular, high credibility most often led these subjects to denigrate the importance of (important and unimportant) attribute dimensions on which the XT-100 was acknowledged to be inferior to its competitors (e.g., "Call screening is not important to me") and "I do not need many colors"), whereas low credibility led them to denigrate the importance of attribute dimensions on which the XT-100 was said to be superior (e.g., "I do not need multiple message memo" and "I have no use for many telephone lines").

**Table 2**

<table>
<thead>
<tr>
<th>Valenced Index of Attribute-Related Thoughts as a Function of Message Type, Source Credibility, and Task Importance</th>
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</thead>
<tbody>
<tr>
<td>Message type</td>
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<tr>
<td>----------------</td>
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<tr>
<td>High importance</td>
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<tr>
<td></td>
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<tr>
<td>Low importance</td>
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</table>

Note. More positive (more negative) numbers signify more positive (more negative) thinking about the XT-100's attributes (see the Method section for details).

\[^{5}\] We also computed a valenced index of argument recall by subtracting from the number of recalled arguments that favored the XT-100 the number of recalled arguments that were unfavorable \((i.e., \text{ "superior" minus "inferior" attribute-comparison recalls})\). The ANOVA on this index yielded only a message type effect, \(F(2, 355) = 66.46, p < .001\). Consistent with the differential ratio of superior to inferior attribute comparisons in the unambiguous versus ambiguous messages \((4.2 \text{ vs. } 3.3)\), subjects recalled more pro than con XT-100 arguments in the unambiguous strong and weak than in the ambiguous message conditions \((Ms = 1.86, 1.22, \text{ and } 0.15)\).
portance and credibility, $F(1, 355) = 14.99, p < .001$, and between importance and message type, $F(2, 355) = 3.61, p < .05$, are qualified by the Importance x Credibility x Message Type interaction we also observed, $F(2, 355) = 7.82, p < .001$. This interaction is depicted in Figure 1.

Simple effects tests within low task importance revealed a reliable effect for credibility, $F(1, 355) = 44.63, p < .001$, but no effect for message type or its interaction with credibility ($p > .25$). As the figure illustrates, exposure to the high- (vs. low-) credibility source substantially enhanced low-importance subjects' attitudes toward the XT-100, but exposure to the unambiguous strong (vs. ambiguous vs. unambiguous weak) message did not ($Ms = 1.76$ vs. $1.41$ vs. $1.24$). In the high-importance conditions all three simple effects were reliable: message type $F(2, 355) = 15.37, p < .001$; credibility $F(1, 355) = 7.41, p < .01$; and Credibility x Message Type $F(2, 355) = 12.43, p < .001$. Unlike low-importance subjects, highs were reliably more persuaded by the unambiguous strong (vs. ambiguous vs. unambiguous weak) message ($Ms = 2.24$ vs. $1.60$ vs. $2.17$). Of greater interest because it confirms our bias hypothesis, the high- (vs. low-) credibility source induced more positive attitudes toward the XT-100 when these subjects received an ambiguous message, simple $F(1, 355) = 25.86, p < .001$. In the unambiguous message conditions, credibility had no reliable impact (both $Fs < 1$).

Path analyses. Source credibility influenced the attitudes of low-importance subjects, regardless of message type, and high-importance subjects who received an ambiguous message. Yet this effect was presumably mediated by heuristic processing alone in

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6 These interaction and main effects were evident on each of the four items that comprised the attitude index, on a reliable or (for one item) marginal basis. More important, all of these effects were reliable in two supplementary ANOVAs on the attitude index that used only Rendition 1 or only Rendition 2 of the ambiguous message. Figure 1's ambiguous message means are averaged across the two renditions. The individual (Renditions 1 and 2) means are, respectively, as follows: high importance–high credibility, 2.32 and 2.44; high importance–low credibility, 1.15 and 0.55; low importance–high credibility, 2.18 and 1.81; and low importance–low credibility, 0.98 and 0.67.
Figure 2. Results of path analyses for low- and high-importance subjects exposed to an unambiguous message or an ambiguous message. Solid lines and broken lines with unidirectional arrows depict reliable and nonreliable paths, respectively; path coefficients (beta weights) appear above each line. Solid lines with bidirectional arrows and the numbers next to them represent zero-order correlations between relevant variables. Higher SC, MF, VST, VAT, and ATT values signify greater source credibility, greater message favorability, more positive source-related and attribute-related thinking, and more positive attitudes toward the XT-100, respectively. (*p < .05. **p < .01. ***p < .001.)

the unimportant conditions and by systematic processing that was biased by heuristic processing in the important ambiguous message conditions. In contrast, the attitudes expressed by high-importance subjects who received an unambiguous message were presumably the product of “unbiased” systematic processing, that is, attribute-related thinking guided mainly by argument quality.

The ANOVAs on our attitude and amount and valence of systematic processing measures produced results consistent with these mediational assumptions. To further explore mediation we conducted four path analyses, for low- and high-importance subjects who received an ambiguous message and for low- and high-importance subjects who received an unambiguous message. The independent variables in these analyses were subjects’ perceptions of source credibility (SC) and message favorability (MF). As Figure 2 illustrates, these analyses estimated the direct paths from SC and MF to attitudes (ATT), the direct paths from valenced attribute-related thinking (VAT) and valenced source-related thinking (VST) to ATT, and the indirect paths from SC to ATT and from MF to ATT (see Baron & Kenny, 1986). Of primary interest to us in these analyses are the SC-ATT, VAT-ATT, MF-VAT-ATT, and SC-VAT-ATT paths. The SC-ATT path indicates that credibility influenced attitudes directly, through heuristic processing. In contrast, the VAT-ATT path indicates that systematic processing influenced attitude judgments, and the SC-VAT-ATT and MF-VAT-ATT paths indicate that the attitudinal impact of the independent variable (SC or MF) was mediated by systematic processing.²

Consistent with the ANOVA findings and our assumption that heuristic processing would be the prime mediator of attitude formation for low-importance subjects, the direct SC-ATT

² In an alternate set of path analyses, the credibility and message type manipulations (strong vs. weak for unambiguous message conditions;
path was reliable in both the ambiguous and unambiguous message analyses (see Figure 2), whereas none of the paths that would indicate a mediating role for systematic processing of message content attained significance. Also compatible with a heuristic processing interpretation, the reliable SC-VST-ATT path in both low-importance analyses indicated that heightened perceptions of credibility enhanced the positivity of subjects' source-related thoughts, which, in turn, fostered more positive attitudes toward the XT-100.8

The attitudes expressed by high-importance subjects were more complexly determined. Of prime interest is the ambiguous message analysis. Congruent with the ANOVA results and our assumption that biased systematic processing mediated these subjects' attitudes, the indirect SC-VAT-ATT path was reliable: heightened perceptions of credibility engendered more positive thinking about the XT-100's attributes, which, in turn, produced more positive attitudes toward this product. In addition, the SC-ATT and SC-VST-ATT paths were reliable, suggesting that heuristic processing exerted an additional, direct attitudinal impact. Attitudes were therefore mediated by a mix of heuristic and biased systematic processing when high-importance subjects received an ambiguous message. Specifically, heuristic processing exerted a direct effect on these subjects' attitudes and an indirect effect that reflected its biasing influence on systematic processing.3

In contrast, the attitudes of high-importance subjects who received an unambiguous message were mediated by unbiased systematic processing (and, to a limited extent, heuristic processing; see below). In conjunction with the ANOVA findings, which revealed higher MF, VAT, and ATT scores when these subjects received the strong (vs. weak) message, the reliable MF-VAT-ATT path indicates that exposure to the higher quality message produced more favorable thinking about the XT-100's attributes, which, in turn, produced more positive attitudes toward this product (see Footnote 9 for discussion of the MF-ATT path). Yet, unbiased systematic processing was not the sole mediator of these subjects' attitudes: In contrast to the implications of the ANOVA results, which yielded a nonsignificant credibility effect for these subjects, the reliable SC-ATT path suggests that their heuristic processing of the source cue exerted an independent and direct persuasive impact. It would therefore appear that attitudes were mediated by a mix of heuristic processing and unbiased systematic processing when high-importance subjects received an unambiguous message.

Locus of attenuation and additivity in the high-importance, unambiguous message conditions. Our recent findings showing that systematic processing attenuates the judgmental impact of heuristic processing primarily when message content undermines the validity of persuasion heuristics suggests an answer to the disparity between the path analytic and ANOVA results for high-importance, unambiguous message subjects: Attenuation should be most apparent among that subset of these subjects who received a weak message from a high-credibility source or a strong message from a low-credibility source (i.e., incongruent source-message cells). Therefore, the attitudinal impact of heuristic processing should be most apparent among subjects who received a strong message from a high-credibility source or a weak message from a low-credibility source (i.e., congruent source-message cells).

We tested this possibility by conducting the same hierarchical regression analysis reported by Maheswaran and Chaiken (1991) and Maheswaran et al. (1992). This analysis regressed high-importance, unambiguous message subjects' attitude scores on their VAT scores, SC scores, and the interaction of each of these predictors with congruency (coded 0 for the congruent and 1 for the incongruent cue-message cells).

Consistent with our path analytic and ANOVA results, the reliable VAT effect in this analysis ($\beta = .52, p < .001$) indicates that systematic processing mediated persuasion for high-motivation subjects who received an unambiguous message. Also consistent with those analyses, this mediation was evident whether the message confirmed or contradicted the validity of the credibility heuristic ($p > .10$ for the Congruency $\times$ VAT interaction). In line with the path analytic (but not ANOVA)

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1 Clear interpretation of this indirect path is not possible. First, VST scores were influenced by the message type manipulation as well as by the credibility manipulation (in contrast, MF and VAT were affected only by message type and SC only by credibility). Second, while compatible with a heuristic interpretation of credibility's persuasive impact, this path is also compatible with a cognitive response interpretation (wherein valenced source-related thinking mediates the effects of communicator variables; see Eagly & Chaiken, 1993). More generally, we note that although data indicating greater thought about heuristic cues than persuasive arguments (such as we obtained under low importance) suggests that attention to heuristic cues is high and that heuristic processing may be predominating over systematic processing, it is not the case that a heuristic interpretation of these cues' judgmental impact requires mediation by the valence of subjects' cue-related thinking.

2 The reliable MF-ATT path in this analysis and in the high-importance, unambiguous message analysis was unpredicted. Although we are unsure how best to interpret this effect, a viable account must consider that this effect was absent under low task importance. We find it plausible that this path represents mediation by some aspect of systematic processing that VAT scores did not reliably measure. Whatever this (potential) aspect, it is not memory for message content: Supplementary path analyses, which also included valenced argument recall (see Footnote 5), produced no findings implicating memory as a mediator of attitudes. Possibly, the MF-ATT path represents mediation by a more truncated form of systematic processing than that tapped by our VAT or valenced recall measures. That is, some high-importance subjects' initial systematic processing efforts may have led them to conclude relatively quickly that the XT-100 was superior to other brands, and on this basis, they formed their attitude judgments without bothering to scrutinize in detail later portions of the message. Although supplementary path analyses for subjects who exhibited above-average versus below-average amounts of systematic processing yielded equivocal findings, the low sample sizes for these analyses preclude definitive conclusions (see also Footnote 7).
results, the reliable SC effect ($\beta = .19, p < .05$) implicates heuristic processing as an additional mediator of these subjects’ attitudes. Most important, the Congruency $\times$ SC interaction ($\beta = -.18, p < .08$) and simple effects tests confirmed that the judgmental impact of heuristic processing was confined to the congruent source-message conditions ($\beta = .34, p < .01; p > .70$ for SC effect within the incongruent conditions).

**Discussion**

The results for low-task-importance subjects replicated past research testing the heuristic-systematic and elaboration likelihood models. These unmotivated subjects scored relatively low on our amount-of-systematic-processing measures and expressed attitudes that were influenced only by source credibility. Moreover, credibility’s direct attitudinal impact in these conditions suggested that subjects had invoked the heuristic that credible communicators’ assertions are valid. Heuristic processing was thus the prime determinant of persuasion when subjects lacked motivation for systematic processing.

The results for high-task-importance subjects who received an unambiguous message also replicated past research. They expressed attitudes that were substantially affected by message content (strong > weak), and this effect was mediated by unbiased systematic processing. Like most previous studies, our ANOVA results implied that heuristic processing had no impact on these motivated subjects’ attitudes. Yet this implication was partly refuted by our hierarchical regression analysis. Consistent with other recent findings (Maheswaran & Chaiken, 1991; Maheswaran et al., 1992), these analyses indicated that systematic processing attenuated the judgmental impact of heuristic processing primarily when message content contradicted the validity of the credibility heuristic; in these high-motivation conditions, systematic processing alone determined attitudes. When content was not contradictory, source credibility did affect attitudes. Moreover, our path analyses indicated that this effect represented the direct, heuristic impact of the credibility cue; in these high-motivation conditions, then, attitudes were independently mediated by heuristic and unbiased systematic processing (additivity).

Of greatest interest are the results we observed for high-importance subjects who read an ambiguous message. These motivated subjects also displayed appreciable systematic processing, and the valence of this processing predicted their attitudes. Yet unlike the ANOVA results for high-motivation subjects who read unambiguous messages, the ANOVA results for these subjects’ attitudes revealed a substantial source-credibility effect, one no smaller than what we found for low-motivation subjects ($F < 1$). Most important, analyses of our attitude and processing measures provided convergent support for our bias hypothesis: In these high-motivation, ambiguous message conditions, source credibility exerted an indirect persuasive impact by positively biasing systematic processing when credibility was high and by negatively biasing systematic processing when credibility was low.

Credibility also exerted a direct attitudinal impact in these conditions, just as it had under low importance. The attitudes of motivated subjects who read an ambiguous message were thus the product of two mechanisms: (a) the direct effect of heuristic processing, in which the heuristic that credible communicators’ assertions are valid was activated by exposure to credibility information and led directly to the judgment that the XT-100 was a superior product, and (b) the indirect effect of heuristic processing, in which activation of the credibility heuristic led subjects to differentially perceive and elaborate on, and ultimately to be differentially persuaded by, the (identical) arguments proffered by the high- versus low-credibility source. Although heuristic and systematic processing both influenced attitudes in this condition, because the latter was biased by heuristic processing the results are best viewed as revealing the interactive rather than independent effects of these modes of processing.

This interactive effect, along with the independence effect we observed among motivated subjects who received unambiguous but cue-congruent message content, validates our model’s assumption that heuristic and systematic processing can co-occur and helps illuminate the circumstances under which each of the potential consequences of co-occurrence may be most apparent. Regarding additivity and attenuation, our recent and current data point to the conclusion that attenuation occurs primarily when systematic processing of unambiguous content is individual information is substantial and this information (or perceivers’ elaborations of it) contradicts the validity of heuristic-based inferences; given noncontradictory information, heuristic processing will exert an independent judgmental impact. Yet this conclusion should be tempered because it ignores the amount of information that is systematically processed (or produced by systematic processing). We suspect that even when such information is noncontradictory, if it is extensive it may be difficult to detect the judgmental impact of heuristic processing.

As for the circumstances under which heuristic processing will bias systematic processing, the results proved consistent with our presumption that such bias is most likely when message content or other individualizing information is ambiguous and thus amenable to differential interpretation or evaluation as a function of the expectations established by heuristic processing. We acknowledge, however, that our operationalization of ambiguity followed more from intuition as to what kind and mixture of arguments and language might foster differential interpretation and evaluation than from some more abstract definition of stimulus ambiguity. It is therefore important that
subsequent research explore alternative ambiguity manipulations to better gauge the bias hypothesis’s boundary conditions and, more generally, to advance understanding of message ambiguity and its role in persuasion.

Additional research should also pay attention to variables that are related to but not identical to message ambiguity. For example, it is possible that Mackie’s (1987) data (see the introduction) patterned in accord with the bias hypothesis merely because her message topic and arguments were unfamiliar to subjects and hence difficult to judge for their intrinsic merit. In fact, several older experiments indicating that recipients regard credible communicator’s arguments as particularly powerful and tend not to challenge them, results compatible with our bias hypothesis, used messages that attacked “cultural truisms” such as sleeping 8 hours per night (e.g., Cook, 1969; Norman, 1976). Because arguments attacking (or sustaining) such truisms are so unfamiliar (McGuire, 1964), subjects in these studies likely turned to the source cue as an indirect means of judging argument quality (see Chaiken, 1978, for discussion).\(^1\)

**Source Credibility and Other Heuristic Cues**

*Source credibility.* We deliberately chose source credibility for our heuristic cue because it has been prominent in persuasion theorizing and research for many years. In fact, some readers might reason that our bias hypothesis and supporting data are paradoxical insofar as they appear to (a) conflict with our model’s key postulate that heuristic cues influence persuasion through simple decision rules and (b) support earlier theoretical accounts that held that source credibility influences persuasion through its impact on people’s tendencies to accept persuasive argumentation (e.g., Fishbein & Ajzen, 1975; Hovland, Janis, & Kelley, 1953; McGuire, 1969; see Eagly & Chaiken, 1993, for review). In reality, there is no paradox. Rather than denying the validity of earlier, “systematic” perspectives, original statements of the heuristic–systematic model argued for the additional possibility that the persuasive impact of heuristic cues such as source credibility might often reflect little more than people’s use of simple decision rules (Chaiken, 1978, 1980). In fact, the model’s bias hypothesis refines earlier views of how source credibility (and other heuristic cues) functions, for it argues that people’s heuristic processing of credibility cues establishes expectancies about message validity, which may then influence their systematic processing of message content. By specifying the conditions under which source credibility is likely to exert a detectable persuasive impact, and the conditions under which this impact is likely to be mediated by heuristic processing alone versus systematic processing that is biased by heuristic processing, our model and its bias hypothesis provide a rapprochement between older and newer views of how this important communication variable affects persuasion.

The elaboration likelihood model also assumes that source credibility may sometimes affect persuasion directly by serving as a peripheral cue (i.e., “simple acceptance or rejection” cue; Petty & Cacioppo, 1984b, p. 669) but at other times may affect persuasion indirectly by biasing the valence of argument processing. According to this model’s multiple-role analysis of source credibility, which of these possibilities (or others) occurs should depend on factors that raise or lower the elaboration likelihood, that is, the probability that recipients scrutinize persuasive argumentation (Petty & Cacioppo, 1984b, 1986; Petty, Kasmer, Hagtvedt, & Cacioppo, 1987). Consistent with our low-task-importance data, credibility is assumed to function as a peripheral cue when the elaboration likelihood is low. Also consistent with aspects of our high-task-importance data, credibility is assumed capable of biasing argument processing when the elaboration likelihood is relatively high.\(^12\)

Although our data can be fitted to this analysis, we prefer our own for several reasons. First, biased argument processing is just one of three predictions that the multiple-role analysis entertains for source credibility in high elaboration settings, and the conditions that favor one prediction over another are not specified in any detail. In fact, our analysis and data could help refine the multiple-role analysis. For example, its biased processing prediction should be favored when persuasive arguments are ambiguous (or, possibly, unfamiliar), whereas its (second) prediction that credibility may exert no persuasive impact in high elaboration settings should be favored when arguments are unambiguous and contradict the validity of the credibility heuristic.\(^13\) Second, the multiple-role analysis does not acknowledge the possibility that source credibility can affect persuasion in high elaboration settings by functioning as a peripheral cue. Our model assumes that credibility can function in this way in such settings (i.e., that it may exert a direct, heuristic effect on attitudes), and our path analyses yielded data consistent with this assumption (see also Maheswaran & Chaiken, 1991; Maheswaran et al., 1992).\(^14\)

**Other heuristic cues.** Finally, although the multiple-role anal-
ysis of credibility represents a general framework for understanding source variables, its predictions are not intended to apply to all variables that our model treats as heuristic cues or to all variables that the elaboration likelihood model treats as peripheral cues. In contrast, the current study's analysis of source credibility derives from our model's conception of heuristic processing and its assumptions about when and how heuristic cues impact on judgment (see Chaiken et al., 1989; Eagly & Chaiken, 1993). As such, our analysis should generalize to other heuristic cues. Thus, if we were to replicate the present experiment using a different heuristic cue (e.g., consensus information or message length) we would expect findings similar to those we observed for source credibility, for similar reasons. For example, given high motivation for systematic processing and an ambiguous persuasive message, we would expect consensus information to exert both a direct attitudinal effect, indicating heuristic processing alone, and an indirect attitudinal effect, indicating the biasing effect of heuristic processing on systematic processing. Subsequent research testing these generalizability claims might also examine whether manipulations that affect capacity for systematic processing (e.g., time pressure and cognitive load) would interact with heuristic cues and message ambiguity in the manner shown here for a motivational manipulation.

Other Determinants of Biased Systematic Processing

This experiment and article emphasize that heuristic processing may bias systematic processing. Yet systematic processing may also be biased by other factors (Chaiken, Giner-Sorolla, & Chen, in press; Chaiken et al., 1989). We regard heuristic processing as a cognitive source of bias. Other factors, such as threats to health (Liberman & Chaiken, 1992), to behavioral privilege (Howard-Pitney, Borgida, & Omoto, 1986), to attitudinal freedom (Petty & Cacioppo, 1979), or to self-worth (Wyer & Frey, 1983), are usefully regarded as motivational sources of bias (see also Footnote 3 and Chaiken et al., 1989). Like heuristic processing, factors such as people’s prior attitudes (Houston & Fazio, 1989; Lord, Ross, & Lepper, 1979) and (possibly) their attitude-relevant knowledge (Wood et al., 1985) may represent cognitive sources of bias (see Chaiken et al., 1989; Petty & Cacioppo, 1986). Yet, particularly when strong, emotionally evocative attitudes are involved, such factors may bias systematic processing for both motivational and cognitive reasons (Biek, Wood, Nations, & Chaiken, 1993; Eagly & Chaiken, 1993, in press; Vallone, Ross, & Lepper, 1985).

Because none of the above experiments manipulated the ambiguity of attitude-relevant information, we are not in a position to claim that all factors that bias systematic processing are most likely to do so when such information is ambiguous. Yet consistent with this claim, we note that the majority of these investigations presented subjects with “mixed” and therefore arguably ambiguous messages (Biek et al., 1993, Experiment 3; Houston & Fazio, 1989; Liberman & Chaiken, 1992; Lord et al., 1979; Vallone et al., 1985; Wyr & Frey, 1983). We speculate that ambiguity may be a more important moderator of biased systematic processing when cognitive sources of bias are involved. Yet even with motivational sources, ambiguity may exacerbate biased systematic processing. Regardless, we believe that the current data point to the value of taking ambiguity into account in future investigations of biased information processing.

Relevance to Other Social Judgment Phenomena

The heuristic–systematic model was originally developed as a theory of attitude formation and change, and most empirical tests of it have concerned this domain. However, when its more general vocabulary is implemented (see Chaiken et al., 1989), the model is easily applied to a variety of other social judgment contexts in which people are exposed to information about other persons, themselves, or impersonal events and make decisions or judgments about these entities (e.g., Allison, Worth, & Campbell, 1990; Bodenhausen, 1990, 1993; Thompson, Roman, Moskowitz, Chaiken, & Bargh, 1994). In fact, numerous findings outside the persuasion domain are consistent with expectations of the model (see Chaiken et al., 1989; Maheswaran & Chaiken, 1991; Smith, in press). For example, perceivers’ tendencies to ignore situational determinants of actors’ behaviors and to thus assume that these behaviors express actors’ true attitudes and dispositions probably reflect their implicit beliefs about the causes of behavior and thus their heuristic processing of behavioral cues (“Behavior X implies Disposition X”); Gilbert, 1989; Trope, 1986). Not surprisingly, this correspondence bias is exacerbated when capacity for systematic processing is constrained (see Gilbert, 1989) but can be attenuated when capacity is adequate and motivation for systematic processing is high (D’Agostino & Fincher-Kiefer, 1992; Tetlock, 1985). Also, perceivers’ tendencies to ignore individuating information about actors and to form stereotype-consistent judgments about them probably reflect perceivers’ knowledge of characteristics stereotypically associated with various social categories (e.g., gender and race) and thus their heuristic processing of salient social category cues (e.g., “Women are unassertive”). Not surprisingly, the tendency to stereotype actors is exacerbated when capacity for processing individuating information is constrained (e.g., Bodenhausen, 1993) but can be attenuated when...
motivation for processing this information is high (e.g., Kuglanski & Freund, 1983; Neuberg & Fiske, 1987).
As these examples illustrate, researchers working within these (and other) social judgment paradigms have produced evidence that parallels that found in contemporary persuasion research. "Individuated" judgments can be promoted and superficial judgments and stereotyping can often be discouraged by ensuring that perceivers are motivated and able to attend to and ponder the relevance and judgment implications of all information to which they are exposed. Moreover, dual-process notions similar to those articulated in our model and the elaboration likelihood model are now commonly applied to these and other social judgment and social cognition paradigms (e.g., Fiske & Neuberg, 1990; Gilbert, 1989; Martin, Crelias, & Seta, 1990; Tetlock, 1992; Thompson et al., 1994; Trope & Ginosar, 1988; see Smith, in press). For the most part, however, research in these allied areas has not yet seriously explored the possibility that "low-effort heuristic" and "high-effort systematic" modes of processing may co-occur and thus exert independent and interdependent effects on judgment of the sort we have discussed and demonstrated in relation to attitude formation (for an exception, see Trope, Cohen, & Alfieri, 1991). We believe that heuristic processing's potential to bias systematic processing is particularly important to examine in alternate judgment paradigms because of its implications for issues such as the maintenance of social stereotypes.

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Received October 29, 1992
Revision received August 30, 1993
Accepted September 7, 1993