Contingent Effects of Anxiety on Message Elaboration and Persuasion

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Abstract

We extend previous research on the debilitating effects of anxiety to the context of message elaboration and persuasion. In two experiments, we manipulate anxiety by exploiting a naturally occurring stressful situation and examine its effects on subsequent message processing. Consistent with research documenting the cognitive deficits produced by anxiety, Experiment 1 shows that high anxiety results in less systematic message processing than low anxiety. We also document a boundary condition for this effect. When increased motivation to process the message can compensate for anxiety deficits (for example, while processing an anxiety-related message) anxiety differences in the amount of processing are no longer observed. Even for a highly involving anxiety-related message, however, differences exist in the type of processing across anxiety levels. Specifically, Experiment 2 shows that despite high levels of motivation, capacity pressures cause heuristic cues in the message to bias the nature of systematic processing such that they skew message processing (and hence, persuasion) in the direction of the cue.

Research on the effects of anxiety has repeatedly documented that performance in tasks that demand cognitive resources is diminished under high anxiety (e.g., Deffenbacher, 1977; Ganzer, 1968; Zatz & Chassin, 1985). According to Eysenck (1979; 1982), high anxiety engages cognitive resources in activities such as worrying, thus leaving less capacity to devote to the task at hand. The debilitating effects of high anxiety have been demonstrated in the context of recall tasks (Hodges & Spielberger, 1969; Miller, Mueller, Goldstein, & Potter, 1978; Mueller, 1976; Mueller, Carlomusto, & Marler, 1977; Walker & Spence, 1964). Research has also documented anxiety-related performance decrements in the context of anagram solving (Deffenbacher, 1978), mathematical problem solving (Hamilton, 1975), and more recently, inferential reasoning (Darke, 1988). In all these studies (see Eysenck, 1982 for a review), high anxiety has been found to reduce task performance in terms of either speed or accuracy.

In this paper, we extend this result to a domain that has received relatively little attention in the anxiety literature, that of message elaboration and comprehension. Because elaboration is a resource-intensive task, high anxiety should lower levels of message elaboration relative to low anxiety. However, drawing from the literature on the antecedents of message elaboration, we also propose, and test, a boundary condition for this effect. Based on the premise that an anxiety-related message will increase processing motivation for high anxiety participants, we predict that the debilitating effects of anxiety that have been documented in past research should be observed only for processing of anxiety-unrelated messages. Experiment 1 supports this prediction and finds equally high processing under high and low levels of anxiety for anxiety-related (but not anxiety-unrelated) messages. We then argue that even when the *amount* of processing is equivalent, the *type* of processing can differ under high versus low anxiety. Building on research documenting the influence of heuristics under conditions of high motivation and low ability (Chaiken & Maheswaran, 1994), Experiment 2 shows that for a highly involving anxiety-related message, message processing and attitudes under high (but not low) anxiety conditions are biased by a salient heuristic cue.

Theoretical Framework

A great deal of research has documented that anxious people exhibit poorer performance on cognitive tasks. For example, in a series of experiments, Darke (1988) showed that high anxiety participants (as compared to low anxiety participants) take a longer time to draw inferences. In one such experiment, participants were exposed to sentence pairs such as: "Bob is taller than Bill" and "Tom is taller than Bob." Immediately afterwards, all participants were asked to respond true/false to a verification sentence: "Bill is smaller than Tom," which required the integration of the previous sentences (Darke, 1988, Experiment 3). Clearly, this task requires cognitive resources, and as expected, high anxiety participants took a longer time to accomplish the integration than low anxiety participants.

Such negative consequences have been documented for trait anxiety defined as "relatively stable individual differences in anxiety proneness," as well as for state anxiety, defined as "subjective, consciously perceived feelings of tension and apprehension, and heightened autonomic nervous system activity" (Spielberger, Gorsuch, & Lushene, 1970, pg. 3). Based on his review of the literature, Eysenck (1979) suggested that the effects of trait anxiety on working memory performances are relatively erratic and inconsistent as compared to those of state anxiety. Accordingly, while much of the material reviewed here relates to both trait and state anxiety, our own experimental focus is on state anxiety, as resulting from environmental stress (Hodges, 1968).

Eysenck (1979, 1982) proposed that anxiety comprises two major components--worry and emotionality (Liebert & Morris, 1967)--that affect task performance. Worry represents the cognitive component of anxiety and leads to distraction from the main task (Deffenbacher, 1978; Ganzer, 1968; Nottelman & Hill, 1977). In other words, worrying reduces the working memory capacity that can be devoted to the task at hand, resulting in poorer task performance. The physiological component of anxiety, emotionality, can also exert a negative influence on processing. Emotionality involves changes

in levels of physiological functioning resulting from nervousness and arousal (which can be measured by heart rate, skin conductance levels, etc.), producing lower levels of cognitive processing (Mueller, 1979; Sanbonmatsu & Kardes, 1988; Schmeck & Spofford, 1982).

While both worry and emotionality can lead to reductions in cognitive capacity, the prevailing view is that anxiety-induced decrements are primarily due to worry rather than arousal (Morris, Brown, & Halbert, 1977; Wine, 1971). Arousal-induced deficits are likely to occur at extremely high levels of anxiety that are typically not produced by laboratory manipulations. In the present research, however, we do not distinguish between the roles of worry and emotionality. Instead, we examine processing consequences of the basic finding that high anxiety is accompanied by reduced cognitive capacity.

The reduced capacity that characterizes high anxiety carries straightforward implications for message elaboration, which can be viewed in terms of the amount of thought/scrutiny devoted to the message (e.g., Petty & Cacioppo, 1986). The persuasion literature posits that message elaboration is driven by the ability as well as motivation to process a message (Chaiken, Liberman, & Eagly, 1989; Petty & Cacioppo, 1986). Other things being equal, therefore, a decrease in either ability or motivation leads to lowered elaboration. Because of lowered cognitive capacity, high anxiety reduces processing ability. Therefore, we predict that, in general, anxiety will impede message elaboration, resulting in a lower number of topic-related thoughts and in reduced claim recall. This reduction in message processing can also affect attitudes toward the issue discussed in the message. For example, if a particular message tends to evoke primarily negative (positive) thoughts, a more favorable (less favorable) attitude can result if elaboration is decreased because of high anxiety.

Will high anxiety always lead to decrements in cognitive processing and consequently, message elaboration? Some empirical evidence suggests otherwise (Dornic, 1977; Spence & Spence, 1966). For instance, Dornic (1977) reported a series of studies in which cognitive performance was no different for

high anxiety versus low anxiety participants (see also Pham, 1996 for similar findings in arousal effects). Further, an analysis of studies using the dual-task paradigm (which investigates performance on the main task as well as a concurrent subsidiary task; Kahnemann, 1973) showed that decrements were usually observed only for the subsidiary task and not for the main task (Eysenck, 1982). These results imply that the debilitating effects of anxiety on message processing may be moderated by situational variables.

Our research focuses on one such moderating variable, namely, processing motivation or message involvement. Specifically, given that elaboration is driven by motivation as well as ability, we suggest that anxiety is less likely to have a debilitating effect when heightened message involvement compensates for ability deficits. Such compensation for ability-related decrements can occur in two ways. First, as stated above, the amount of elaboration is generally perceived as a continuum, the exact level of which is determined by both ability and motivation. Thus, unless ability is below critical threshold levels, an increase in motivation (via involvement) should increase elaboration or systematic processing. Second, when ability is constrained, people are likely to doubt whether systematic message processing can help them attain their goal of holding valid attitudes (Chaiken et al. 1989). Accordingly, "ability-impairing variables probably undermine people's *motivation* for systematic processing, as well as their capacity for systematic processing" (Chaiken et al. 1989, pg. 224). To the extent, therefore, that a decrease in message elaboration is produced by such motivation-mediated effects of ability deficits, an increase in motivation should help to reinstate higher levels of elaboration for high-anxiety participants.

The argument that increased motivation can compensate for lowered ability and result in equivalent performance under high and low anxiety is consistent with prior explanations offered for null effects of anxiety. For example, Eysenck (1979, 1982) suggests that high anxiety participants may sometimes attempt to compensate for worry-induced distraction by putting in more effort into the task,

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thus negating the impact of reduced ability (see also Dornic, 1977). This effort-based explanation

accounts for findings related to the dual task paradigm discussed earlier. Performance differences

between high and low anxiety participants are not observed for the main task because anxious people

attempt to compensate for the effects of worrying by increasing effort on the main (but not subsidiary)

task. Dual task findings are thus consistent with our proposition that increased motivation (effort) can

compensate for capacity deficits.

While processing motivation can be heightened by a variety of factors, we focus on the role of

anxiety-relatedness. If the topic of the message has some bearing on the source of the anxiety,

participants should be more motivated to engage in effortful processing than when the message topic is

irrelevant to the anxiety source. An anxiety-related message should lead to heightened message

involvement (and thus, greater motivation) for high anxiety participants simply because such a message

focuses on a topic that is particularly salient to this group of people, and is therefore more personally

relevant than an unrelated message. This proposition is consistent with Eysenck's (1979) speculation

that greater anxiety will lead to greater effort (reducing the effects of lowered ability) only when the

source of felt anxiety is intrinsic to the task.[1]

To summarize, our review of the literature suggests that high anxiety is generally associated with

reduced cognitive capacity, thus leading to inferior performance on tasks involving cognitive resources,

such as message elaboration and comprehension. However, given that message elaboration is driven by

motivation as well as capacity, heightened motivation may compensate for capacity deficits under high

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[1] One reason for the lack of empirical evidence on this issue may have to do with the way anxiety is studied in laboratory research. Typically, anxiety has been produced by the same task on which performance measures are to be taken (e.g., studies on test anxiety). Such tasks, almost by definition, are related to the source of anxiety. By our reasoning, therefore, ability-induced deficits on task performance should be diluted by the facilitatory influence of increased effort/motivation – which is exactly the result obtained in dual-task studies. By separating the task (message processing) from the source of anxiety, the current research allows a test of the moderating effects of task/message relatedness.

anxiety conditions. A message which is related to the source of anxiety is likely to be more personally

relevant (and thus, more involving) to high anxiety participants than an anxiety-unrelated message.

Therefore, we predict that the debilitating effects of anxiety on message elaboration should be observed

for anxiety-unrelated but not anxiety-related messages.

Experiment 1

The experiment utilized a 2 (anxiety level: high vs. low) x 2 (message relevance: related vs.

unrelated) design and was conducted in April 1997 with sixty six undergraduate students at a large

university in Hong Kong. Participants were randomly assigned to one of the four cells in the design.

Manipulations

Anxiety. State anxiety was manipulated by exploiting a naturally-occurring situation which

carried overtones of stress and tension (e.g., Mogg, Mathews, & Bird, 1990). The experiment was

conducted a few months before Hong Kong's recent reunification with China (on July 1st, 1997). The

information used to manipulate anxiety consisted of (fictitious) newspaper headlines touching on

handover-related issues. High anxiety participants were exposed to seven headlines warning of negative

consequences of the handover (e.g., "Handover likely to intensify competition for jobs in Hong Kong").

In contrast, the equivalent statement in the low anxiety condition alleviated worry about the post-

handover situation (e.g., "Handover likely to increase jobs in Hong Kong"). Both headlines were

credible in that different newspapers at that time reported conflicting information about the impact of the

transition on Hong Kong. A between-subjects pretest (n = 82) confirmed that high anxiety headlines

induced greater anxiety than low anxiety headlines (Ms = 4.50 vs. 3.82 on a 7-point scale; F (1, 80) =

7.45, p < .01) The means indicate that, as desired, only moderate levels of anxiety were induced even in

the high anxiety condition. Our theorizing is not meant to apply to extremely high levels of anxiety,

where factors such as defensive avoidance of the message may exert an important influence on message

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processing (e.g., Jepson & Chaiken, 1990).

Note that low anxiety could also have been manipulated by exposing participants to non-handover related headlines. However, this manipulation could have introduced an important confound. Specifically, if high anxiety (but not low anxiety) participants had received handover-related headlines, the former group would be more likely to retrieve knowledge structures related to the handover, thus aiding the processing of a handover-related message. Access of knowledge structures rather than motivation to process could then explain enhanced processing by high anxiety participants exposed to a related message. Note that such an effect would not be due to the fact that the high anxiety condition were first exposed to anxiety-inducing statements--simply that they saw statements related to the message. To avoid this potential confound, both high and low anxiety participants were exposed to handover-related headlines, though the valence of these headlines differed across conditions.[2]

Message relevance. This factor (message related vs. not related to the source of anxiety) was manipulated via a newspaper extract that participants read after reading the seven headlines manipulating anxiety. The related (unrelated) message was entitled "July 1st Handover Ceremony" ("University Graduation Ceremony") and contained criticisms made of extravagance in government (university) spending for the handover (graduation) ceremony, as well as rebuttals made by the administration. A pretest where 119 participants rated both extracts on the degree to which each was related to the handover of Hong Kong to China (i.e., the source of anxiety) on a seven-point scale (1 = unrelated, 7 = related) confirmed that the handover ceremony extract was more related to the handover ($\underline{M}$ = 5.35) than the graduation ceremony extract ($\underline{M}$ = 2.93. $\underline{F}$(1,118) = 12. 94, $\underline{p}$ < .01). The two messages were equated

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[2] A pretest had also revealed that the relatively positive statements in the low anxiety condition did not lead to an enhanced affective state compared to baseline levels. A group exposed to the low anxiety headlines was compared with a group exposed to neutral headlines (e.g., "Madeline Albright new US Secretary of State"). These two conditions did not report any differences in felt anxiety (M's low anxiety = 4.15, neutral anxiety = 3.89, F(1,78) > .20) or even on mood (M's low anxiety = 4.12. neutral anxiety = 4.17, F < 1).

on content and length. Further, the two topics were also pretested to be equally important to our population (handover ceremony $\underline{M}$ = 6.25; graduation ceremony $\underline{M}$ = 6.71, $\underline{F}$ (1,38) < 1, ns; nine-point scale with higher numbers indicating greater importance).

Finally, pretest data on retrospective thoughts after exposure to the message revealed that both messages evoked an overall negative reaction. Across the two topics, a thought index computed as the difference between positive and negative message thoughts was found to be significantly lower than zero ($\underline{M_{diff}}$ = -.50, t_{diff} (1,63) = -2.97, $\underline{p}$ < .01). The value of this index did not vary significantly between the unrelated topic ($\underline{M}$ = -.62) and the related topic ($\underline{M}$ = -.37, $\underline{F}$ < 1, ns). Accordingly, we expected that lower message elaboration would result in a more favorable attitude toward the ceremony described in the extract, for both topics.

Procedure

Participants were told that they would participate in two different studies and received a booklet containing the cover story, stimulus materials, and two different questionnaires. The first questionnaire was presented as a study about clarity of English language newspaper headlines and contained the seven headline statements that manipulated anxiety. Participants rated each of the seven statements for clarity. They then indicated how anxious they had felt while reading the headlines on a seven-point scale ranging from "not at all anxious" to "very anxious."

Following a blank page, participants were exposed to Questionnaire 2 under the guise of a study about comprehension of newspaper extracts. The first page of the questionnaire contained a newspaper extract (comprising 3 short paragraphs) focusing either on the upcoming handover or graduation ceremony. Participants were informed that they would all be given the same amount of time to read the extract and were asked to read the extract as if they were reading it in a newspaper. At the end of one minute (found to be sufficient for passage comprehension in a pretest), participants were asked to stop

reading the passage and go on to the next page of the booklet. Participants then completed a standard seventeen-item inventory measuring trait anxiety (Sarason, 1972). Next, depending on which condition (related message/unrelated message) they were in, participants indicated how important either the handover ceremony or the graduation ceremony was to them, on a nine-point semantic differential scale ranging from "unimportant" to "important."

Subsequently, participants completed a recognition test where they were presented with eight statements and asked to rate whether the extract had made that specific claim, on a seven-point scale anchored at definitely false (1) and definitely true (7). Intermediate points on the scale were also associated with descriptive phrases (e.g., if participants felt the statement was most probably false, they circled "2"). It was made clear to participants that they should base their responses only on the extract they had read. Half the statements were actually contained in the extract and should have been rated "True." Next, participants were asked to write down the thoughts they had while reading the extract. Subsequently, they indicated their attitudes toward the issue that they had read about (handover/graduation ceremony) on a set of four seven-point semantic differential scales anchored by: a) not at all angry/very angry; b) not at all happy/very happy; c) not at all irritated/very irritated; and d) not at all pleased/very pleased. The first and third scale items were reverse scored and an attitude index was formed by averaging scores on the four scales (Cronbach's alpha = .80). Finally, a detailed debriefing was carried out before participants were thanked and dismissed.

Results

Analyses were conducted in the context of a 2 (anxiety level) x 2 (message relevance) ANOVA. Trait anxiety was used as a covariate and did not affect any of the analyses. Table 1 lists the mean scores across conditions.

[Insert Table 1 about here]

Manipulation Checks. The anxiety manipulation was successful, with participants exposed to the high anxiety headlines reporting a higher level of anxiety than participants exposed to the low anxiety headlines (Ms = 4.31 vs. 3.32; F (1, 62) = 9.55, p < .01). No other effects were significant on these checks. As in the pretest, the two topics were rated to be equally important (Handover topic M = 6.77, Graduation topic M = 7.32; F (1,62) = 1.57, p > .20).

Cognitive Responses. Two coders who were blind to the hypotheses classified these responses as to whether they were relevant to the message theme (e.g., thoughts about the ceremony, or about the organizers, or about the handover itself), or irrelevant to the message theme (e.g., "the article was not very long"), and also on the basis of valence (positive, negative and neutral). Coder agreement in each category exceeded 80% and disagreements were resolved by discussion. A 2 x 2 ANOVA revealed only a significant interaction effect of anxiety and message (F(1, 62) = 5.02, p < .05). Consistent with predictions, planned contrasts within each level of message relevance revealed that anxiety had a debilitating effect on processing for the unrelated topic (Ms low anxiety = 2.86, high anxiety = 1.65; F(1, 62) = 4.60, p < .05), but not for the related topic (Ms low anxiety = 2.59, high anxiety = 3.11; F < 1).

Recognition. The four false items on the True/False test were reverse scored and a mean score was computed across all eight items for each subject. As expected, ANOVA revealed a main effect of anxiety (F(1,62) = 3.57, p < .07), such that high anxiety led to a decrease in recognition (Ms low anxiety = 5.15; high anxiety = 4.83). The interaction of message relevance and anxiety did not reach significance F(1,62) = 1.28, p > .20). However, planned contrasts (cf. Winer 1971) revealed that high anxiety caused decreased recognition only for the unrelated topic (Ms low anxiety = 5.26, high anxiety = 4.74; F(1,62) = 4.28, p < .05). For the related topic, as predicted, high and low anxiety participants did not differ in their recognition scores (Ms low anxiety = 5.25, high anxiety = 5.12; F < 1).

Attitude index. The attitude questions measured generalized affect toward the message topic

(handover ceremony/graduation ceremony). Given pretest findings that both messages evoked negative thoughts, we expected lower levels of message elaboration to yield more favorable attitudes. Results revealed a main effect of message, with more favorable attitudes for the unrelated graduation ceremony topic versus the related handover ceremony topic (Ms unrelated = 4.71, related = 4.15; $F(1,62) = 4.39$, $p < .05$). More importantly, the interaction of message relevance and anxiety was significant ($F(1,62) = 4.09$, $p < .05$). Planned contrasts revealed that, as expected, attitudes did not differ within the related topic condition (Ms low anxiety = 4.25, high anxiety = 3.97; $F < 1$), suggesting equivalent processing. Also as expected, attitudes were more favorable for high anxiety subjects as compared to low anxiety subjects for the unrelated topic (Ms low anxiety = 4.26, high anxiety = 5.01; $F(1,62) = 4.09$, $p < .05$), suggesting lower elaboration by high versus low anxiety subjects.

Mediational analyses (Baron & Kenny 1986) were conduced to test the premise that attitude differences in the unrelated topic condition were based on differences in message elaboration. First, we created a valenced thoughts index (VTI), defined as the difference between positive and negative message-relevant thoughts. In order to show that the effect of anxiety on attitudes within the unrelated topic was mediated by differences in cognitive elaboration, we first need to show that, parallel with the pattern of attitude results, high anxiety led to a more favorable (less negative) VTI than low anxiety. Analysis of the unrelated topic data confirmed this premise (Ms low anxiety = -1.14, high anxiety = -.35, $t(29) = 1.71$, $p < .05$, one-tailed).[3] Second, we checked that the valenced thought index explained a significant amount of attitude variance within the unrelated topic. This was found to be the case ($F(1, 29) = 25.11$, $p < .001$). The final check for mediation consisted of testing whether the previously significant effect of anxiety on attitudes within the unrelated topic ($t(29) = 1.8$, $p < .05$, one-tailed) was

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[3] Within the related topic, as expected, there was no difference in VTI for low anxiety (M = -.94) versus high anxiety (M = -1.22, $F < 1$).

reduced by the inclusion of VTI in the attitude analysis. Analyses confirmed that once the influence of

elaboration had been accounted for by the VTI mediator ($\underline{F}$ (1,29)= 20.21, $\underline{p}$ < .001), anxiety no longer

had a significant effect on attitudes ($\underline{F}$ < 1, ns).

<u>Discussion</u>

Results from Experiment 1 extend previous findings documenting the debilitating effects of

anxiety to the domain of message comprehension and elaboration. Given a message unrelated to the

source of anxiety, high anxiety participants elaborated less than low anxiety participants, and exhibited

poorer claim recognition. Experiment 1 also documents a boundary condition for the basic anxiety

finding. Specifically, when the message was related to the source of anxiety, high-anxiety participants

displayed increased levels of message elaboration and comprehension, equivalent to that of low-anxiety

participants. Furthermore, while the attitude findings reported here are exploratory (because message

valence was simply measured, not manipulated), it is reassuring that these interactive effects of anxiety

and message relatedness were also reflected in the attitude data. As with message elaboration,

differences in attitudes towards the message topic were obtained for the unrelated topic, but not for the

related topic.

Experiment 1 findings may be taken to indicate that there are no differences between high and

low anxiety processing of an anxiety-related message. However, such a conclusion would be premature.

This is because, even for an anxiety-related message, high and low anxiety conditions differ in terms of

the antecedents of message elaboration. Whereas low anxiety participants do not suffer from any

capacity decrements, our theorizing suggests that high anxiety participants are able to engage in an

equivalent amount of elaboration only because high motivation compensates for their reduced cognitive

capacity. Experiment 2 aims to demonstrate that these differences in the antecedents of elaboration for

an anxiety-related message lead to significant differences in the *type* of processing for high versus low

anxiety conditions (even though the *amount* of processing does not differ across anxiety conditions).

Experiment 2

Research based on the Heuristic-Systematic Model of persuasion (HSM; Chaiken, Liberman &

Eagly, 1989) has examined processing differences caused by differences in the antecedents of

elaboration. According to this model, systematic processing involves active elaboration of message

arguments, whereas heuristic processing is a much less cognitively taxing mode in which people focus

on heuristics (or simple cues) to form judgments. A central tenet of this model is that heuristic

processing can co-occur with systematic processing and exercise interdependent effects on persuasion

(Chaiken &Maheswaran 1994; Maheswaran & Chaiken 1991). In one instance of such interdependence,

Chaiken and Maheswaran (1994) found that under conditions of high message involvement, the valence

of a heuristic cue (source credibility) biased the direction of systematic processing such that the credible

source led to more positive attitudes than the non-credible source. The heuristic cue exercised such an

impact on persuasion even though the amount of message elaboration was high, indicating systematic

processing.

Chaiken et al. (1989) assert that such biased processing is particularly likely to occur when high

motivation is accompanied by lowered cognitive capacity. Under such conditions, even though message

recipients are highly motivated to engage in processing, they lack the ability "to confidently judge the

intrinsic validity of persuasive arguments" (Chaiken et al. 1989, p. 245). Therefore, a cue that is easily

processed can bias the systematic processing that is induced by high motivation. Such conditions (high

motivation and low ability) were present in the Chaiken and Mahswaran (1994) study in which high

motivation was induced through high involvement and low processing ability was operationalized via

participants' unfamiliarity with the message topic.

Chaiken et al. (1989; see also Eagly & Chaiken, 1993) point out that low ability may be induced

by factors other than unfamiliarity, such as time pressure and distraction. Research on anxiety suggests that high anxiety is another factor that can lead to lowered ability. Therefore, if our theorizing is correct, the processing of an involving, anxiety-related message is likely to be accompanied by both high motivation and lowered cognitive capacity. In such a context, the valence of a simple heuristic (or cue) which sets up evaluative expectations of the message content (e.g., a valenced message headline) should bias message elaboration for high anxiety participants, but not for low anxiety participants.[4]

In addition to high involvement and low capacity, a third factor needs to be present for the biasing effect to be observed (Chaiken et al.. 1989; Chaiken & Maheswaran, 1994). The message should be sufficiently ambiguous in nature, so that the output of systematic processing can actually be interpreted in various ways, depending on the valence of the heuristic cue. If the message content is unambiguous (e.g., a very strong message or a very weak message), recipients will be able to confidently judge the intrinsic validity of the message and the heuristic cue is unlikely to exercise any biasing effect (Chaiken & Maheswaran, 1994).

Experiment 2 compares message elaboration and resultant persuasion for high versus low anxiety participants in the context of an anxiety-related ambiguous message. We predict equivalent amounts of elaboration for high and low anxiety participants but expect that the type of elaboration (and consequently persuasion) will differ. Biased elaboration will be reflected in the content of systematic processing (i.e.. interpretation of message claims) such that these interpretations will be biased in the direction of the heuristic cue for high (but not low) anxiety participants. As a result of such biased

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[4] The HSM does not discount the possibility that a heuristic cue may exercise an impact on persuasion even under conditions of high involvement and high ability -- under such conditions, heuristic processing of the cue may exert an effect on persuasion that is independent of, and additive with systematic processing. However, researchers in this area have pointed out (e.g.,Eagly & Chaiken, 1993) that the influence of heuristic processing under such conditions may not be detectable because of the overwhelming amount of systematic processing occurring concurrently.

processing, the cue should influence post-message attitudes for high anxiety participants, but not for low

anxiety participants. This experiment utilized a 2 (anxiety level: high vs. low) × 2 (message headline

cue valence: positive vs. negative) between-subjects design and an ambiguous, anxiety-related message.

Eighty-three undergraduate business students at a large Hong Kong University participated in the

experiment. At the time of the experiment (March 1998), South East Asia was going through a major

economic recession that had important implications for the job prospects of participants in our subject

pool of undergraduate business students. We exploited this situation and manipulated state anxiety prior

to message exposure by presenting participants with fictitious newspaper headlines that painted a

pessimistic (optimistic) picture of the economy's impact on the job market. Given our focus on the

processing of an anxiety-related message, the message to be processed also concerned job prospects.

Specifically, all participants received an ambiguous message containing details of a (fictitious) Hong

Kong survey on the link between an undergraduate business specialization and career prospects.[5] Cue

valence was manipulated via the headline of the survey results message. The specific stimuli and

manipulations used in the experiment were identified on the basis of several rounds of pretests.

Manipulations

Anxiety. Two stages of pretesting were undertaken to select appropriate "newspaper headlines" for

the low and high anxiety conditions. In the first stage, 17 participants were exposed to a set of (fictitious)

positively or negatively valenced newspaper headlines relating to the impact of the economic crisis on local

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[5]The message theme was deliberately chosen to have a high degree of intrinsic relevance to our participant population (undergraduate business students), for two reasons. First, Experiment 1 findings depicting equal amounts of processing for an anxiety-related message across anxiety conditions were obtained using a message topic (handover ceremony) that had limited personal relevance to the student population. Because intrinsic personal relevance itself contributes to message involvement, it is possible that processing was quite low even in the low anxiety condition , thus facilitating our key result that high anxiety participants were able to engage in as much processing as low anxiety participants. By studying the processing of an anxiety-related message that was also high in intrinsic relevance, Experiment 2 sought to address this concern. Second, research in this area (Chaiken & Maheswaran 1994) suggests that it is easier to detect biases in systematic processing at high absolute levels of processing – such as are likely to be present while processing a message of high personal relevance.

job prospects. Negative headlines warned of the negative consequences of the economic crisis (e.g., "IMF reforms will hurt regional job markets") whereas positive headlines alleviated worry about job prospects (e.g., "IMF reforms will help regional job markets"). Participants were asked to rate each headline for how positive or negative it made them feel about their own job prospects, on a scale from 1 (makes me feel negative) to 7 (makes me feel positive). Significant differences between the positive and negative versions were obtained on seven of the headlines used in this stage (all p's < .05). In the second stage of pretesting, the positive or negative versions of these seven headlines were given to 40 participants (n = 20 in each condition). Participants were asked to read the set of headlines (all positive or all negative) for clarity, and then asked to report how they felt on reading the headlines. These responses were recorded on three seven-point scales (not at all anxious/very anxious; not at all nervous/very nervous; not at all uncomfortable/very uncomfortable; $\alpha = 0.87$). These scales were averaged to form an index of felt anxiety. Analyses revealed that the negatively valenced headlines induced more anxiety (M = 4.60) than the positively valenced headlines (M = 3.17; F (1, 38) = 14.82, p < .01).[6]

Message headline cue valence. The message to be processed (see below) was presented as a newspaper extract reporting findings from a Hong Kong survey on the link between students' undergraduate specializations and career prospects. The valence of the extract headline served as the cue manipulation. The headline was presented in a bold and bigger font than the extract itself. In the negative (positive) condition, the headline stated: "Undergraduate Business Degree Leads to Poor (Excellent) Career Prospects." A pretest confirmed that participants were more likely to expect a positive message on job prospects when they saw

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[6] As in Experiment 1, we checked that the relatively positive headlines used to induce low anxiety did not lead to an enhanced affective state as compared to baseline levels, by comparing the "low anxiety" group with another group which was exposed to neutral headlines (e.g., "Vajpayee new Prime Minister of India"). A comparison of the neutral and low anxiety conditions showed no differences in felt anxiety (M's = 3.27 vs. 3.17; F < 1) or mood (M's = 4.3 vs. 4.45; F < 1).

the positive headline ($\underline{M}$ = 5.55) as compared to the negative headline ($\underline{M}$ = 2.45, seven-item scale, t_{diff} = 3.23, $\underline{p}$ < .05).

<center>Stimuli</center>

All participants in the main experiment received an ambiguous message containing arguments both for and against the proposition that undergraduate business students in Hong Kong had good job prospects. Following Chaiken and Maheswaran (1994), the ambiguous message contained positive arguments (i.e., information suggesting that a business degree led to favorable career prospects) on two important attributes (job availability and starting salaries) and one unimportant attribute (French survey results). Similarly, negative arguments (i.e., information suggesting that a business degree does not lead to favorable career prospects) was also presented on two important attributes (job performance records and promotion prospects) and one unimportant attribute (engineering students' opinions). In order to make the arguments more concrete, the business degree was compared with an engineering degree on most of the arguments presented. For example, a positive argument relating to job availability (an important attribute) indicated that "students with undergraduate degrees in business administration have 60% more choices available to them when they finish their programs, as compared to students with degrees in other areas such as engineering."

The important and unimportant attributes used to construct the message were identified on the basis of a pretest. Twenty participants rated ten attributes on a seven-point scale, in response to the following question: "If you were asked to judge the link between an undergraduate business degree and job prospects in Hong Kong, how much importance would you give to each of the following pieces of information when making your judgment?" All three important attributes used in the ambiguous message received importance scores greater than 4.8, whereas all three unimportant attributes received scores less

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than 3.4 (all comparisons between important and unimportant attributes differed at p < .05).[7]

While the major objective of this experiment was to uncover differences in types of processing, a pilot test was first carried out to confirm that both high and low anxiety participants would engage in equivalently high *amounts* of processing for the message topic discussed above. A direct test of amount of processing can be provided by observing differences in attitudes obtained by unambiguously strong versus unambiguously weak messages (Chaiken, 1980; Petty & Cacioppo, 1986). If high and low anxiety participants engage in systematic processing (i.e, high elaboration), both groups should be more persuaded by a strong message as compared to a weak message and this advantage of a strong message (over a weak one) should not differ between the two groups. Finally, if high levels of elaboration prevail, post-message attitudes should primarily be influenced by the message content and not by a relatively unsubstantive cue such as the valence of the message headline.

The pilot study investigated post-message attitudes towards an undergraduate business specialization across all possible combinations of headline cue valence (positive/negative), anxiety level (high/low) and message strength (unambiguous strong/ unambiguous weak). The strong (weak) message was created by presenting positive (negative) information on important attributes and negative (positive) information on unimportant attributes (Chaiken & Maheswaran, 1994). Analyses of post-message attitudes revealed only a main effect of message strength ($F(1,108) = 6.11$, $p < .05$), with the strong message producing a more favorable attitude ($M = 4.20$) than the weak message ($M = 3.69$). The interaction of message strength and anxiety level was not significant ($F < 1$), indicating that message

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[7] Other versions of the ambiguous message could also have been constructed by varying the attributes on which positive/negative information was presented. However, the importance ratings of the various attributes in the "important" set. as well as the ratings of those in the "unimportant" set, did not differ significantly. Accordingly, we might expect that the different important attributes, and also the different unimportant attributes, would be interchangeable in terms of constructing messages of a particular strength.

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elaboration was equivalent across low and high anxiety. Finally, as would be expected under conditions of high elaboration, cue valence had no effect on attitudes ($\underline{F}(1,108) = 1.22$, $\underline{p} > .26$), and did not interact with the other factors. These results are consistent with the premise that high and low anxiety participants both engaged in equivalent amounts of systematic message processing. Further, the output of message processing was not biased by the headline cue, for either group of participants.

The main experiment uses an ambiguous message to test the proposition that high and low anxiety participants are likely to differ in the *type* of processing that they undertake, even if they display equal *amounts* of processing. Specifically, this experiment seeks to demonstrate that the output of systematic processing for an ambiguous message is biased by cue valence under high anxiety conditions.

Procedure

The procedure followed that used in the first experiment. Participants were exposed to the anxiety headlines in the first stimulus booklet, which was presented as a study on headline clarity. After rating the headlines on clarity, participants were given a second stimulus booklet in the guise of an experiment on "newspaper extract comprehension". The first page of this booklet contained the ambiguous version of the message, consisting of six bulleted items of information (purportedly taken from a survey) on the link between undergraduate specializations and job prospects in Hong Kong. After reading the extract, participants indicated their degree of agreement (1= Disagree; 7 = Agree) with two attitudinal statements: a) A business degree is better than other specializations in terms of job prospects in Hong Kong; and b) Completing a business degree in Hong Kong will lead to good job prospects. An index of issue attitude was computed as the mean of these two responses ($\underline{r} = .54$). The attitude analyses were conducted on this index; however, identical results were obtained when the individual scale items were used as the attitudinal measure.

The next page contained an open-ended recall measure, in which participants were asked to write

down everything they could remember from the survey. The recall protocols were coded for the total

number of claims correctly recalled from the message, as well as the valence of the recalled information.

Next, participants' reactions to the six specific items of information presented in the message were

probed by asking them how well these specific claims supported the overall theme of good job prospects

for Hong Kong business graduates (for a similar measure, see Liberman & Chaiken, 1992). For each

item of information (e.g, "information about job availability"), participants were asked to indicate their

level of agreement with the assertion that, according to that piece of information, "Hong Kong business

graduates have good job prospects, as compared to graduates who have specialized in other areas."

Responses to these scales (which were made on a 7-point scale: 1 = disagree, 7 = agree) reflected

participants' interpretations of specific message arguments and served as an indicator of the type of

processing. If attitudes are formed on the basis of systematic message processing, a high correlation

should be obtained between these attitudes and message claim interpretations (Liberman and Chaiken,

1992; Miniard et al., 1991).[8]

After responding to the agreement measures, participants were asked to indicate message

involvement on a seven point scale measuring how carefully they had read the survey (1= not at all

carefully; 7 = very carefully). This measure was followed by the seventeen-item measure of trait anxiety.

As in Experiment 1, trait anxiety did not affect the results and is not discussed further. Finally,

participants were debriefed and dismissed. Unlike Experiment 1, Experiment 2 did not measure

headline-induced anxiety in the main study, because of concerns that anxiety measurement might affect

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[8] Prior research in this area (Chaiken & Maheswaran 1994) has documented systematic processing by checking for the mediating impact of attribute-related thoughts (as distinct from cue-related thoughts). However, pilot testing revealed that the particular cue (message headline valence) that was used in the current experiment was not distinct enough for thoughts to be separated into claim-related thoughts versus cue-related thoughts, thus precluding the use of a thoughts-based mediating factor. Accordingly, the claims-interpretation measure was used instead (see Liberman & Chaiken 1992; Miniard et al. 1991 for similar analyses).

actual levels of felt anxiety.

<h2 style="text-align:center">Results</h2>

Analyses were conducted in the context of a 2 (anxiety level: high vs. low) 2 (message headline

cue valence: positive vs. negative) ANOVA. Means by condition are listed in Table 2.

<p style="text-align:center">[Insert Table 2 about here]</p>

Manipulation Checks. No significant effects were obtained on anxiety-inducing headline clarity

(Ms low = 4.79, high = 5.00) or on how carefully the anxiety-inducing headlines were read (Ms low =

4.43, high = 4.85), indicating that both low and high anxiety evoking headlines were processed to the

same degree. Further, no effects were obtained on how carefully the newspaper extract itself was read,

with both high anxiety (M = 5.58) and low anxiety participants (M = 5.40) displaying equivalent and

high levels of message involvement (F < 1).

Open-ended recall. High anxiety participants (M = 2.02) and low anxiety participants (M =

2.19) did not differ in terms of message claim recall (F < 1), suggesting equal amounts of elaboration

across anxiety conditions (Wyer & Srull, 1989). Valence of recall also did not differ by anxiety

condition. All other effects on these recall measures were also non-significant.

Attitudes. Analysis on the crucial post-message attitude index revealed only the expected

significant interaction of anxiety level and cue valence (F(1,79) = 5.67, p < .05). Planned contrasts

showed that cue valence did not exert a significant impact on attitudes for low anxiety participants

(positive headline M = 4.26, negative headline M = 3.89; F(1,79) = 1.11, p > .29). As predicted,

however, cue valence had a significant impact on post-message attitudes for high anxiety participants

(F(1,79) = 5.33, p < .05), with the positive headline leading to more favorable attitudes (M = 4.47) as

compared to the negative headline (M = 3.67).

How did the heuristic cue exert an impact on high-anxiety attitudes? Results from our pilot test,

combined with the equivalent recall obtained across anxiety conditions, as well as the high levels of

message involvement reported for both low and high anxiety, suggest that systematic processing

prevailed under conditions of high anxiety as well as low anxiety. According to our theory, the heuristic

cue actually exerted an impact on the content of systematic processing (e.g., interpretation of specific

message claims) en route to influencing attitudes under high anxiety. To explore this possibility, we

examined participants' reactions to specific message claims under conditions of high anxiety. If the

effect of the cue on high anxiety attitudes was mediated by careful processing of message arguments, the

cue should also have exerted an impact on participants' interpretations of these claims (Liberman &

Chaiken 1992; Miniard et al., 1991). A message-processing index was computed by summing the

responses to the scales which measured participants' reactions to each of the specific message claims.

Higher scores on the processing index reflect greater agreement with the premise that the message claims

indicated favorable job prospects for business graduates--i.e., higher scores represent a more positive

interpretation of message claims. Because agreement with the final message claim (regarding long-term

job prospects) was poorly correlated with agreement with the other five claims, the sixth scale item was

excluded from the index; however, its inclusion did not change any of the results reported below.

As expected, under high anxiety, cue valence exerted a significant impact on the processing

index ($\underline{F}(1, 39) = 4.34$), with higher scores (more positive interpretation) being reported in the positive

cue ($\underline{M} = 4.29$) compared to the negative cue ($\underline{M} = 3.80$) condition.[9] Mediation analysis with the

processing index as the mediator of the cue effect on attitudes was used to test the proposition that biased

systematic processing was responsible for the attitudinal effect of the cue under high anxiety conditions.

This analysis was carried out for the high anxiety participants and involved testing for: a) a significant

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[9] In keeping with the pattern of attitude results, cue valence did not influence the processing index under conditions
of low anxiety ($\underline{M}$'s: negative cue = 4.28, positive cue = 4.22. $\underline{F} < 1$, ns).

link between the processing index and attitudes, and b) diminution of the significant impact of message headline cue valence on attitudes when the processing index is included in the model (Baron & Kenny 1986). As expected, the processing index was found to produce a significant impact on post-message attitudes ($F(1, 39) = 14.44$, $p < .001$). Inclusion of the processing index as a mediator of cue effects in the attitude analysis reduced the impact of the cue on attitudes to non-significance ($F(1, 39) = 2.69$, $p > .10$), as compared with the significant cue effect when the processing index was not included ($F(1,39) = 6.3$, $p < .05$). These analyses indicate that the headline cue did not have a direct effect on post-message attitudes under conditions of high anxiety; rather its effect was mediated by biased processing of message claims.

Discussion

Results from the pilot study that investigated processing for an anxiety-related, *unambiguous* message reinforced findings from Experiment 1 that high anxiety participants engage in the same *amount* or processing as low anxiety participants despite impaired cognitive ability.[10] The main experiment qualified this finding and showed that for high anxiety participants, systematic processing of an involving, but ambiguous message, can be biased by a salient cognitive cue. Specifically, high anxiety participants used the valence of the message headline to disambiguate message claims. They interpreted ambiguous claims more positively when the headline was positive (versus negative). The effect of this bias in processing was also evident in high anxiety participants' attitudes--the message featuring the positive headline was significantly more persuasive than the equivalent message featuring the negative headline. These findings parallel earlier research documenting the biasing effect of a cue on systematic

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[10] It should be noted that in Experiment 2, motivation to process the message under high anxiety could have stemmed both from the relatedness of the message to the source of anxiety and from the intrinsically high relevance of the message to the target population. This does not, however, detract from the basic proposition that increased motivation can compensate for anxiety deficits.

processing (Chaiken & Maheswaran, 1994) and support our premise that high anxiety processing for an involving message is determined by high motivation but low ability. Under low anxiety conditions, on the other hand, where cognitive deficits are not expected to occur, message processing and attitudes were not influenced by the headline cue.

The current results allow us to address an alternative explanation for the Experiment 1 finding that anxiety reduces elaboration for a message which is unrelated to the source of anxiety, but not for an anxiety-related message. While we argued that these results were due to the increased message involvement that anxious participants are likely to experience for a related message compared to an unrelated one, it is also possible to construct an ability-based explanation for these findings. Specifically, the greater thematic congruence of anxiety-inducing headlines with an anxiety-related message (versus an unrelated message) could have lead to a greater ability to process the related message, because of the accessibility of relevant knowledge structures.

The current results offer a strong argument against this explanation. If an anxiety-related message increases processing ability for anxious participants, these participants should possess both high processing motivation (because the message used in Experiment 2 was a highly involving one) and high ability. Under such conditions, attitudes should not be influenced by heuristic processing--therefore, akin to the low anxiety condition, cue valence should not exert an impact on high anxiety attitudes. Such, however, was not the case--cue valence exerted a significant impact on attitudes under high anxiety, even though motivation was high, as shown by our involvement manipulation check. As Chaiken et al. (1989) point out, the influence of a cue is particularly likely to be observed under conditions of high motivation when cognitive capacity is low. Our findings are more consistent with the premise that anxious participants do suffer from cognitive deficits, even while processing an anxiety-related message.

Finally, while we have theorized that message processing for high anxiety participants in this

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experiment was subject to a cognitive bias (induced by cue valence), it is not unreasonable to expect that

anxiety should lead to motivationally biased processing. Indeed, recent research on fear appeals

(Liberman & Chaiken, 1992) has found evidence of such bias in the context of an ambiguous message on

the link between caffeine intake and health hazards. Coffee drinkers processed the message in a biased

fashion as compared to non-drinkers, as manifested both in processing measures (reactions to individual

message claims) and message persuasiveness (coffee drinkers were less likely to believe in the link as

compared to non-drinkers). In this study, as in the current investigation, amount of processing did not

differ across levels of fear; however the type of processing did.

In light of these findings, one might posit that a similar motivational bias should have occurred

for high anxiety participants in the current experiment. However, such a bias would be manifested in a

main effect of anxiety on post-message attitudes, with high anxiety participants likely to have a more

favorable attitude towards the business specialization than low anxiety participants, irrespective of cue

valence. As reported earlier, such a main effect was not obtained. Rather, we found a significant

interaction of anxiety and cue valence, a pattern more consistent with our proposed process mechanism

involving the cognitive bias induced by the headline cue. Further, an examination of the pattern of claim

recall yielded no evidence that high anxiety participants (in either cue condition) were more likely to pay

greater attention to favorable information as compared to low anxiety participants. Again, this finding

argues against the motivational bias position.[11]

As a final note on this issue, it should be pointed out that it is not always possible to disentangle

the effects of cognitive bias from those produced by motivational bias. For example, a motivational

explanation has been put forth for the finding that people tend to be more persuaded by majority-

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[11] One reason why motivational bias may have been less likely to occur in the current research as compared to
Liberman & Chaiken (1992) has to do with the relatively moderate levels of anxiety that were evoked in our studies.
Consistent with this premise, Eagly & Chaiken (1993; see also Chaiken et al., 1989) suggest that motivationally

endorsed arguments than by minority-endorsed arguments (Mackie, 1987). Since the information

(majority or minority opinion) presented to participants in this study represented the opinions of the

subjects' peer group, a desire to validate the opinions of their membership group (a motivational bias)

could have led to the greater persuasion produced by the majority's arguments. However, as Chaiken et

al. (1989; see also Chaiken & Maheswaran, 1994) point out, these findings can also be explained on the

grounds of a cognitive bias. Participants probably possessed very little knowledge about the message

topic (the role of the US in ensuring a military balance in the Western Hemisphere), thus leading to a

reliance on a salient heuristic: consensus information. Use of this heuristic would lead to greater

agreement with the majority than the minority. Clearly, further research is needed to sort out different

types of biasing effects on message processing and persuasion.

General Discussion

This research supports the idea that, contradictory to previous empirical work on the effects of

anxiety, high levels of anxiety need not always deter cognitive activity. Enhanced motivation to process

can compensate for deficits in cognitive capacity induced by high anxiety. Such enhanced motivation

was demonstrated in the case of messages that are related to the source of anxiety and are personally

relevant to participants. Motivational compensation for reduced cognitive capacity comes at a price.

Capacity pressures may cause heuristic cues in the message to bias the systematic processing of message

arguments, thus producing an effect on attitudes as well Overall, the results obtained in our research

highlight both similarities and differences in message processing under conditions of high versus low

anxiety. For a relatively uninvolving, anxiety-unrelated message, differences do exist in the amount of

processing across anxiety levels. On the other hand, for an anxiety-related message, the amount of

processing is similar for high and low anxiety participants. Even for such a message, however,

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biased processing is only likely to be observed under conditions of high fear.

differences exist across anxiety conditions in terms of type of processing.

The bias findings in Experiment 2 are particularly interesting in light of the relative dearth of such findings in the extant literature. Research based on the HSM makes the general point that heuristic processing and systematic processing may occur simultaneously and interact with each other. A substantial amount of evidence has been found for two such processes--one whereby attitudes are *additively* affected by the effects of heuristic as well as systematic processing, and another whereby the effects of heuristic processing are *attenuated* by those of systematic processing (Aaker & Sengupta, forthcoming; Maheswaran & Chaiken, 1991: Maheswaran et al., 1992). As Chaiken et al. (1989) point out, there is a third way in which the two types of processing may interact, whereby heuristic processing *biases* the output of systematic processing. However, apart from the current findings, and those obtained by Chaiken and Maheswaran (1994), this type of interaction does not appear to have been documented elsewhere. As Chaiken et al. (1989) point out, this lack of evidence for biasing effects may be a result of the fairly narrow conditions that are necessary to observe such effects. Apart from the combination of high motivation (required for systematic processing) and reduced capacity (which enhances heuristic processing), the message to be processed has to be ambiguous enough to lend itself to more than one interpretation. Under such conditions, the heuristic cue is likely to come in useful for disambiguating message information, as was observed under the high anxiety conditions in Experiment 2 of the current research. Indeed, findings from our pilot test for this experiment supported the idea that the heuristic cue is unlikely to have any impact while processing an unambiguous message.

While our findings for the anxiety-related message (in terms of amount as well as type of processing) represent the major contribution of this research, the results obtained for the anxiety-unrelated message in Experiment 1 help to extend earlier findings on high-anxiety related deficits to the context of message elaboration and comprehension. Prior research on anxiety has not, to the best of our

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knowledge, studied the effects of anxiety in this context. Message processing has, however, been examined by two related streams of research, one dealing with fear effects and the other with the effects of mood. Some areas of overlap between these research streams and anxiety-related research (particularly the current findings) are discussed below.

Fear Appeals and Anxiety

Recent research by Gleicher and Petty (1992) is particularly relevant to Experiment 1 findings documenting the reduced message processing under conditions of high anxiety, for an anxiety-unrelated message. These researchers studied the impact of fear evoked by a radio broadcast, on the processing of a subsequent message discussing an increase in tuition in order to fund a proposed campus security program. Message relatedness was manipulated by varying the source of fear--the radio program presented a discussion of campus crime (related source) or an illness that was prevalent on campus (unrelated source). Message strength was varied by presenting either strong or weak arguments in favor of a security program. Further, the message was prefaced by a short paragraph in which an expert source either presented a clear or unclear assurance of the security programs' efficacy. Findings within the "unclear assurance" condition are particularly relevant to our research. As we would predict, when the source of fear was related to the message, both high fear and low fear participants exhibited equally high levels of processing (as shown in the separation of strong and weak messages). Unlike the current research (Experiment 1), however, equally high levels of processing across fear conditions were obtained even when the source of fear was unrelated to the message.

One explanation for this discrepancy relates to the high intrinsic motivation induced by the message itself. We have argued that the greater motivation induced by an anxiety-related message (as compared to an unrelated one) underlies the finding of equal processing across anxiety levels for such a message. Processing motivation, as we have discussed earlier (see footnote 10), can arise from a variety

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of sources, including the intrinsic personal relevance of the message. Thus, if intrinsic message relevance (and therefore processing involvement) is sufficiently high, it may compensate for any cognitive deficits produced by high fear/high anxiety. Indeed, Gleicher and Petty (1992, p. 91) seem to be in agreement, pointing out that "the high personal relevance of the message itself which advocated raising tuition to fund a crime watch program at the students' own university should induce message processing." Thus, the highly involving nature of the message itself may have led to the high processing across fear levels, even when the source of fear was unrelated to the message.

Another explanation for the apparent discrepancy between our results and those of Gleicher and Petty (1992) has to do with the subtle distinctions between the constructs of fear and anxiety. Research on affect has shown that similar emotions can nevertheless have certain important differences in terms of antecedents and consequences (Conway, Clore, & Schwarz, 1994). In this regard, the definitions offered by Lazarus (1991, pg. 164) are highly pertinent. He defines anxiety as arising from "uncertain, existential threat," (see also Murphy & Zajonc, 1993 for a similar explication of anxiety) whereas fear is evoked by "an immediate, concrete, physical danger."[12] Because of its relatively diffuse, uncertain nature, anxiety may be more likely than fear to be accompanied by worry, which reduces the cognitive capacity available for message processing. Thus, it is possible that the presence of anxiety-related worrying represents a qualitative difference between the constructs of fear and anxiety--anxiety, more than fear, is likely to be accompanied by worrying, leading to cognitive deficits (and reduced message elaboration) in conditions of high anxiety but not necessarily high fear.

While these ideas regarding the qualitative difference between fear and anxiety are speculative,

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[12]In this connection, it should be noted that fear-evoking message in Gleicher & Petty's (1992) study did rely on concrete physical threats (illness or crime-related) whereas physical threat was not the theme with the anxiety-evoking headlines used in the current research.

this difference may also explain why fear appeals are more likely to lead to a motivationally biased type of processing than anxiety manipulations. If fear is indeed associated with a more immediate, focused threat than anxiety, presumably the motivation for fear reduction/danger control is stronger in the former case, leading to a motivational bias in processing. We have already noted research documenting the motivational bias induced by fear appeals (Liberman & Chaiken, 1992). Similarly, Gleicher and Petty (1992) also use a motivational position to explain their findings. Thus, they find that when given a clear reassurance by an expert endorser of the efficacy of the proposed security program, participants in the high fear condition display reduced message processing--presumably because their need for reassurance has already been satisfied. The current research does not find evidence for such a motivational bias. Further research is needed to further explore the differences that may exist between fear and anxiety and their differential effects on message processing.

Mood and Anxiety

Several researchers have also examined the effects of mood on message processing and elaboration. While this research differs as to whether mood effects on processing are caused by capacity or motivational differences, the typical finding in the area is that a bad mood leads to greater processing and heightened elaboration as compared to a good mood or a neutral mood (Mackie & Worth, 1989, 1991; Schwarz, Bless, & Bohner, 1991). Anxiety, clearly, may be thought of as a type of bad mood (Foa et al., 1989). However, research on anxiety effects (including the current work) suggests that high anxiety reduces cognitive capacity and diminishes elaboration and recall compared to low or neutral anxiety. How might this discrepancy be resolved?

It is possible that anxiety may differ both qualitatively and quantitatively from moods that have been studied in the extant literature. For example, researchers have typically manipulated mood on the basis of a positive/negative event having already occurred to the participants (e.g., finding a coin in a

telephone booth; reviewing negative life events, etc.). Anxiety differs from these manipulations in that it is an expectation of negative consequences, and can thus induce distraction due to worry, in turn reducing elaboration (at least for unrelated topics). Thus, just as anxiety differs from fear in that the former is more likely to be accompanied by worry, so might anxiety differ from a bad mood in this regard. As with fear, such a difference would explain differences in message processing under high anxiety conditions versus processing under a bad mood

From a quantitative standpoint, it is possible that anxiety is more intense (i.e., a worse mood) than moods resulting from commonly used mood manipulations. If this is the case, it would help explain why high anxiety, but not a bad mood, leads to lowered processing. Some evidence suggests that, contrary to typical mood findings, people who are very sad actually process less than happy people (Peterson & Seligman, 1984), presumably due to the listlessness caused by extreme depression.

Finally, some recent research based on a mood management perspective (Wegner & Petty, 1994; Wegner, Petty. & Smith, 1995) suggests that people in a happy mood are more likely to elaborate on a non-threatening or uplifting topic, as compared to a threatening one. Thus, for the former kind of topic, people in a happy mood may sometimes end up processing more than people in a sad mood. This perspective relates well to current findings depicting increased processing under low anxiety compared to high anxiety, for an anxiety-unrelated message. However, it should be pointed out that Wegner et al's findings relate specifically to a happy mood, not a neutral mood. In the current research, pretests showed that the mood induced by low-anxiety headlines was comparable to that induced by neutral headlines. As such, it would be inaccurate to label this mood a "happy" one. Even with this caveat however, the notion that the topic itself may influence whether a happy mood leads to greater or less processing than a sad mood is consistent with our findings and represents an opportunity for future research interested in reconciling some of the findings in the mood literature.

Table 1

<p align="center"><u>Experiment 1</u></p>

	Unrelated Topic		Related Topic	
	Low Anxiety	High Anxiety	Low Anxiety	High Anxiety
ANXIETY	3.29 (1.20)	4.35 (1.46)	3.35 (1.41)	4.28 (1.18)
RECOGNITION	5.26 (0.43)	4.74 (0.63)	5.25 (0.81)	5.12 (0.81)
ATTITUDE	4.26 (1.28)	5.01 (1.03)	4.25 (1.03)	3.97 (0.77)
MESSAGE THOUGHTS	2.86 (1.33)	1.65 (1.58)	2.59 (1.06)	3.11 (1.94)
VALENCED THOUGHTS	-1.14 (1.56)	-0.35 (0.99)	-0.94 (1.20)	-1.22 (1.59)

Note: Standard deviations in parentheses.

Table 2

Experiment 2

	Low Anxiety		High Anxiety	
	Negative Cue	Positive Cue	Negative Cue	Positive Cue
ATTITUDE	4.26	3.89	3.67	4.48
	(1.21)	(1.19)	(1.14)	(0.90)
BELIEFS	4.28	4.22	3.80	4.29
	(0.64)	(0.88)	(0.86)	(0.62)
RECALL	2.22	2.16	1.90	2.15
	(1.13)	(1.30)	(1.09)	(1.39)

Note: Standard deviations in parentheses.

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