Motivation and Emotion, Vol. 16, No. 4, 1992

Negative Emotion and Superficial Social Processing[1]

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Two studies examined whether negative emotional arousal increases the tendency to process social information less carefully. In both studies, subjects were dental patients waiting to receive a filling from a student dentist. In Study 1, 48 subjects responded to illusory correlation materials adopted from Hamilton & Rose (1980). As expected, those above the median on self-reported anxiety were more likely than low-anxious subjects to exhibit illusory correlation effects. In Study 2, fear level was manipulated. Thirty-four dental patients were instructed to evaluate critically a persuasive message after receiving either graphic descriptions of their upcoming procedure or filler information. As expected, the message evaluations made by high-fear subjects were more influenced by superficial cues (audience applause) and less influenced by central cues (message content) than the message evaluations made by subjects

[1]We would like to thank John Cacioppo for commenting on an earlier draft. Bev Hamann, Joyce Paul, and Pam Young also deserve thanks for their excellent secretarial contributions. Thanks also to Ron Fisher and Chris Racelis for running studies I and II and Tami Fuller for collecting pilot data.
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0146-7239/92/1200-0323$06.50

reporting at least moderate to high initial anxiety about dental treatment at the outset of the study. Theoretical and social implications are discussed.

A good number of psychological phenomena seem to result from superficial, low-effort processing. Some examples would include schematic biases (Fiske & Taylor, 1984), the use of various cognitive heuristics (Sherman & Corty, 1984), and superficial message processing (Eagly & Chaiken, 1984; Petty & Cacioppo, 1986). Our research explores the possibility that individuals will be particularly likely to utilize such simplifying cognitive strategies when experiencing negative emotions. This prediction can be derived from either of two related perspectives. First, several extensive reviews of the attention literature have concluded that stressful emotional arousal limits attentional capacity (Broadbent, 1971; Cohen, 1978; Easterbrook, 1959; Kahneman, 1973). These conclusions have been based on the fact that manipulations such as threat, heat, task overload, and crowding have been found to impair performance on tasks such as digit-span memory, dual-task performance, and incidental memory.

At least one explanation for such effects is that negative emotional arousal triggers physiological changes that affect cortical activity (specifically heightening recurrent lateral inhibition), thereby lowering attentional capacity (Eysenck, 1977; Walley & Weiden, 1973). If negative emotion does lower capacity, as this "reduced-capacity" view suggests, one would expect such states to increase superficial processing, given that when attentional resources are limited, individuals do not have the capacity to consider deeply the various processing demands they face (Cohen, 1978). They, therefore, are more likely to employ superficial forms of processing. Indeed, it is possible that this tendency to employ strategies of cognitive simplification in stressful settings has adaptive significance given that carefully husbanding one's limited attentional capacity better allows one to maintain some "reserve" capacity to appraise and cope with additional threatening environmental demands that occur.

A closely related but alternative view is that, under stress, individuals are more likely to allocate available attentional capacity to (a) appraising the stressor, (b) appraising their responses to the stressor, and (c) coping with the stressor (Lazarus, 1981; Mandler, 1975). As a result, stressed individuals are less likely to attend to other, stress-irrelevant, demands. Stated differently, this "attention allocation" view suggests that, when experiencing stressful emotions, our primary motivation is to process stress-relevant stimuli, and if we allocate attention in this manner (cf. Kahneman, 1973), we leave less capacity available for other processing demands. Although the reduced-capacity and attention-allocation views specify slightly different

processes, both suggest that less capacity will usually be used for stress-irrelevant processing when individuals experience substantial negative affect. This reasoning leads us to predict that stress-induced emotional arousal should exacerbate those social psychological phenomena that result from superficial processing (Baron, 1986).[3]

There are some initial data on this issue. Baron and Moore (1987) found that exercise-induced arousal heightened an effect often associated with schematic processing — the self-referent memory effect reported by Kuiper and Rogers (1979). In addition, Kim and Baron (1988) examined how exercise-induced arousal affected the illusory correlation effect reported by Hamilton and Rose (1980). In the Hamilton and Rose procedure, subjects read sentences about members of several occupational groups and then estimated how many times a given adjective was used to describe each occupation. Hamilton and Rose reported that subjects overestimated the frequency of those adjectives that were stereotypically associated with the occupation. In short, subjects' frequency estimates (i.e., their memory of the presented material) were clearly biased by their preexisting occupational stereotypes. Apparently, subjects faced with a difficult memory task, rely on such stereotypes to "guesstimate" what the actual presented frequencies "must have been."

Consistent with our view that stress should elevate superficial processing, Kim and Baron (1988) found, as predicted, that this illusory correlation phenomenon was more pronounced among highly aroused subjects. Presumably, this effect occurred because arousal (due to its effect on capacity) impaired the encoding, rehearsal, or retrieval of stimulus material, thereby requiring subjects to rely more on occupational stereotypes when attempting to respond to experimental queries about the material. These two studies (Baron & Moore, 1987; Kim & Baron, 1988), which focused on the impact of arousal on schematic bias and stereotyping are complemented by Sanbonmatsu and Kardes' (1988) report that exercise-induced arousal, randomly administered just prior to a persuasive message, increased subjects' responsivity to peripheral message cues (source status) while it decreased the extent to which they were affected by central message cues (argument strength). Given that this response pattern is thought to characterize individuals who are using a superficial message processing strategy (e.g., Eagly & Chaiken, 1984; Petty and Cacioppo, 1986), these data are quite congruent with our general predictions.

[3]It is important to note that our focus is on *emotional* states rather than on *mood* states. The former are usually characterized (Fiske & Taylor, 1984; Isen, 1984) as demanding attention (Ryle, 1949), interrupting thoughts and behaviors (Mandler, 1975), and producing physiological arousal (Schachter & Singer, 1962). *Mood* states, in contrast, often occur without physiological arousal and are not directed at specific targets (Isen, 1984).

The results of the studies by Baron and Moore (1987), Kim and Baron (1988), and Sanbonmatsu and Kardes (1988) are quite consistent with our view that arousal should exacerbate various cognitive biases and increase the likelihood of low-effort cognitive processing. These studies are limited, however, in that they do not examine emotional forms of arousal but instead manipulate arousal through the use of exercise. While this type of physical stress produces distinct effects on respiration, body temperature, pulse, and blood pressure (Zillmann, Katcher, & Milansky, 1972), it can hardly be deemed an emotion manipulation. This is an important point. Most of the research and theorizing linking arousal to reduced attentional capacity emphasize emotional rather than purely physiological manipulations (e.g., Easterbrook, 1959). While emotional and exercise manipulations may both affect physiological responding, there are important differences between the two. Negative emotion, more than exercise-induced arousal, seems likely to trigger attributional processes (Schachter & Singer, 1962) and appraisal and coping efforts (Lazarus, 1981) that should absorb a good deal of attentional capacity leaving less free for other forms of cognitive processing. Thus, in theory, emotional manipulations, particularly those involving substantial and unpredictable stressors, should lead to more dramatic evidence of superficial social processing than manipulations involving exercise-induced arousal.

Moreover, from a socially pragmatic perspective, we should be particularly interested in how negative emotional states such as fear, anger, and frustration affect social perception, since biases and distortions under such conditions could easily produce costly and/or disruptive behavior. Consequently, it seems necessary to extend our research by examining whether a stress-related emotional manipulation produces effects on social processing that resemble those found with vigorous exercise. One straightforward way to approach this issue would be to employ some standard laboratory stressor such as shock, cold pressor stress, social insult, etc., as an emotion manipulation. We were reluctant to employ this strategy for two reasons. First, the intensity of such manipulations are limited by ethical considerations. Moreover, in our experience, subjects are increasingly aware of these limitations and, as a result, rarely experience the strong emotional feelings that are primarily of interest. (How bad can this be? It's just a psychology experiment. If it is awful I can quit.) As a result, we elected to conduct our research in a dental clinic where stress was likely to occur naturalistically. In Study 1, subjects waiting for a dental filling were divided into high- and low-anxiety groups based on their scores on the state subscale of the State-Trait Anxiety Scale (Spielberger, 1983). Scores on this subscale have been found to be positively related to several physiological indices

of sympathetic activation associated with emotional arousal (Spielberger, 1984).[4] All subjects then read the illusory correlation materials employed by Kim and Baron (1988). Our prediction was that stronger illusory correlation effects would be found among the highly anxious subjects. We felt justified in employing a one-tailed test of this prediction, given the previous significant demonstration of conceptually similar outcomes in prior research (Baron & Moore, 1987; Kim & Baron, 1988; see also Discussion section below) and given our strong theoretical expectation. Study 2 introduced a manipulation of dental fear and examined whether this fear heightened superficial social processing of persuasive material.

STUDY 1

Method

Subjects

Twenty-two male and 26 female patients at the University of Iowa College of Dentistry Clinic who were scheduled to receive a filling from a student dentist in the Junior Operative Clinic participated voluntarily in the study after being asked to participate by telephone recruitment. Mean age in this sample was 43.

Stimulus Materials

The stimulus materials were closely modeled on those employed by Hamilton and Rose (1980). These stimuli were two sets of 24 sentences of the form: "Joan a stewardess is wise and gentle." Each set of sentences were read by the same person onto an audiocassette tape in an enthusiastic manner at a rate of approximately one sentence in 2 sec with 1 sec between each sentence. In each 24-sentence set, eight sentences described women identified as stewardesses; eight described librarians; and eight described waitresses (these last eight sentences were used as fillers). Two adjectives were used in each sentence (as above). These adjectives were

[4]Both the State (e.g., Schandry, 1981) and the Trait (e.g., Montgomery, 1977) subscales of the STAI have been found to be positively related to increases in heart rate, blood pressure, spontaneous skin conductance, respiration, and chronic hypertension (cf. Spielberger, 1984). Additionally, the Trait and State subscales differentiate those suffering from diagnosed anxiety disorders from normals. Moreover, the State subscale (but not the Trait subscale) is responsive to relaxation treatments directed at reducing such anxiety (Lichstein, Sallis, Hill, & Young, 1981). While there are some null physiological findings (e.g., Kilpatrick, 1972), overall the data suggest that the scale has substantial construct validity as an index of emotional arousal and it is not uncommon for researchers to use the scale as such (e.g., Tyler and Tucker, 1982).

prejudged by 119 dental patients to be either (a) characteristic of the given occupation (occupationally consistent), (b) uncharacteristic, or (c) neutral. In each set of 24 sentences, a given adjective appeared in six sentences. These sentences described two people in each of the three occupations (e.g., two stewardesses, librarians and waitresses were described as gentle, wise, etc.).

The adjectives *comforting, gentle, modern,* and *stylish* were judged by pilot subjects to be highly characteristic of stewardesses (and neutral for waitresses and librarians). The adjectives *practical, serious, studious,* and *intelligent* were seen as characteristic of librarians and neutral for stewardesses and waitresses. The adjectives *creative, boring, amusing, generous,* and *modest* were neutral for all three occupations while the adjective *humorous* was rated to be characteristic of waitresses but neutral regarding the other two occupations. Given that we purposely selected eight of our adjectives to be "consistent" for one occupation and neutral for the other two (see above), we were able to construe them as either consistent or neutral depending upon the occupation they were paired with in a given sentence. One 24-sentence list used two of the four "consistent" adjectives (for each occupation), never presenting the other two adjectives in any sentence in that list. The other 24-sentence list reversed this process using the remaining two adjectives (for each occupation). This allowed us to employ one set as "presented" stimuli and the other set as "nonpresented" stimuli (see below). See Kim and Baron, 1988 for additional details.

The 24 sentences from one of the two sets were presented to subjects by tape recorder in random order, with the restriction that the filler (waitress) sentences were the first and the last three sentences, to minimize primacy and recency effects. After hearing all 24 sentences, subjects were given the frequency estimate questionnaire used by Kim and Baron (1988). This questionnaire informed subjects that they had just heard eight sentences describing each of three occupational groups and that they would now be asked to make estimates regarding the number of times each trait adjective was used to describe each occupation. Each of the following pages contained an occupation name (stewardess, librarian, waitress) on the top and a list of 14 adjectives. Among these adjectives, eight were those which had been presented while the remaining six were new items. Of these new items, two were stewardess-consistent adjectives, two were librarian-consistent adjectives, and two were neutral. As the extremely assiduous reader will have noted, this arrangement required that two adjectives appear on both lists as presented adjectives. These adjectives were *humorous* (waitress-consistent) and *creative* (neutral). The two sets of 24 sentences were counterbalanced so that, across subjects, a given adjective was used equally often as an originally presented or "new" item.

Procedure

The experiment was conducted in a clinic waiting room adjacent to a student operative clinic, containing 16 operative stations. Subjects were asked to report $^1/_2$ hour before their scheduled dental appointment (with a student dentist). Subjects met the experimenter and were told the study concerned their ability to form impressions of others in a dental situation. Subjects were seated in a corner of the waiting room facing the wall and the experimenter in order to minimize distractions. Following informed consent procedures, subjects completed the State subscale of the State Trait Anxiety Index (STAI) (Spielberger, 1983) and a brief demographic questionnaire. The State Trait Anxiety Questionnaire includes statements such as "I feel calm," "I feel jittery," etc., accompanied by a 4-point scale varying from *not at all* to *very much so.* Subjects were instructed to indicate on these items how they felt "at the moment." Subjects then used headphones and listened to the 5-min stimulus tape after adjusting the tape volume to a comfortable level. Following this, subjects completed the frequency estimate questionnaire. They were then thanked and debriefed.

Data Reduction and Analysis

A median split (median = 66) was used on the state subscale of the STAI to group subjects into high- and low-anxious groups. Fortunately, males and females were distributed approximately equally across these two groups. Fourteen women and 10 men were classed as high anxious while 12 women and 12 men were classed as low anxious ($\chi^2 < 1$, n.s.). As reported in the paper by Kim and Baron (1988), the primary dependent measure was derived from the frequency estimates for the different types of trait adjectives (i.e., consistent vs. neutral; presented vs. nonpresented). Only the frequency estimates for the librarian and stewardess occupations were included in the analysis. Each subject's frequency estimates for the trait adjectives of each type were averaged, and from this average estimate, the actual frequency (i.e., 2 for presented items and 0 for nonpresented items) was subtracted in order to obtain an estimate error score. This procedure was followed so that subjects' errors in estimation in both presented and nonpresented conditions would be reported on a common scale. (See Kim & Baron, 1988, for details.) This estimate error score was used in an analysis which included high/low anxiety as a between-subjects factor and presented/nonpresented material and consistent/neutral as within-subject factors. Technically the range of these estimate error scores was not specified; however, given that subjects were told, in the instructions, that only

eight sentences were used to describe each occupation and given that no adjective was ever repeated in the same sentence, the highest estimate error scores one would reasonably expect to see would be 6 (8 — 2) for presented adjectives and 8 (8 — 0) for nonpresented adjectives.

Results

Estimate Error Scores

The ANOVA of estimate error scores produced a strong consistency main effect, $F(1, 46) = 48, p < .001$, indicating that subjects were more likely to overestimate consistent adjectives ($M = 2.91$) than neutral ($M = 1.66$). There was also an anxiety main effect $F(1, 46) = 4.36, p < .04$, indicating that larger estimates were given by high-anxious subjects ($M = 2.7$) than by low-anxious subjects ($M = 1.83$). The presented/nonpresented main effect was not significant $F(1, 46) = 2.38, p < .15$. These main effects were qualified by several interactions. There was an Anxiety × Presented/ Nonpresented interaction $F(1, 46) = 3.91, p = .054$, reflecting the fact that the higher-frequency estimates of highly anxious subjects were most pronounced on nonpresented adjectives. There was also a Presented/ Nonpresented × Consistency interaction [$F(1, 46) = 18.46, p < .001$] reflecting the fact that higher error scores (i.e., higher-frequency estimates) were given to consistent than to neutral adjectives among presented items. Even among nonpresented adjectives, however, the simple consistency effect was significant, $F(1, 46) = 5.43, p < .05$. Finally, the key Anxiety × Consistency interaction was significant, $F(1, 46) = 3.30, p = .04$, one-tailed. A priori contrasts of these simple effects (examining our key prediction) indicated that, as predicted, the estimate error scores of high-anxious subjects were significantly greater than those of low-anxious subjects when estimating the frequency of consistent adjectives $F(1, 46) = 6.05, p < .05$, but *not* when estimating the frequency of neutral adjectives $F(1, 46 = 1.37$, n.s.). See Table I for means.

Discussion

These data are quite congruent with our overall hypothesis. The tendency for subjects to recall stereotype-consistent adjectives occurring more frequently than stereotype-neutral words replicates the basic illusory correlation effect reported by Hamilton and Rose (1980). As predicted, the illusory correlation effect was more pronounced among highly anxious patients, with the latter offering significantly larger estimates of stereotype-consistent adjectives than low-anxious subjects ($p < .05$).

Table I. Average Estimate Error Scores as a Function of Anxiety Level and Type of Adjective[a]

	Adjective type	
Anxiety level	Neutral	Consistent
High anxious (n = 24)	1.95	3.53
Low anxious (n = 24)	1.37	2.29

[a] Numbers reflect overestimates. See the text for a description of how estimate error scores were computed. The simple effect between high- and low-anxious subjects when estimating consistent adjectives was $F(1, 46) = 6.05$, $p < .05$. For neutral adjectives this simple effect was $F(1, 46) = 1.37$, n.s. The ms error used to test these effects was 3.05.

These data also conceptually replicate Kim and Baron's (1988) finding that exercise-induced arousal enhances illusory correlation effects. In the study by Kim and Baron, this interaction was found with presented adjectives but not with nonpresented adjectives. This led those authors to speculate on the possibility that the exercised-induced arousal used in that study dissipated before it could bias any retrieval processes affecting estimates for nonpresented adjectives. Such exercise manipulations heighten arousal for 6 to 8 min, as a rule (Baron & Moore, 1987). In the present study, any arousal created by the stress of an upcoming dental treatment should not dissipate over the period of the experimental procedure. As a result, the fact that this emotional distress elevated illusory correlations for both presented and nonpresented adjectives is generally congruent with Kim and Baron's speculation regarding the differential impact of their exercise treatment. Taken together, the two studies represent converging evidence that emotional arousal heightens subjects' reliance on stereotypes and indeed, when viewed in conjunction, raises confidence in the reliability of this data pattern. Moreover, the data are generally congruent with our hypothesis that emotional arousal will increase the likelihood of low-effort processing. In fairness, however, our case would be stronger if Study 1 had not relied on a subject variable, but instead had utilized random assignment to fear conditions. While we feel this problem is mitigated somewhat by the very similar findings in Kim and Baron's random-assignment study, one could always argue that some correlate of dental anxiety is truly causing the observed effects in Study 1.

Study 2 addresses this issue. Initially we were not quite sure how to manipulate high and low anxiety randomly in a naturalistic situation that most people find at least moderately distressing. One cannot easily assign patients at random to receive a high- or low-stress dental procedure, for instance. However, the personal experience of one of the coauthors provided

us with a clue. While completely calm in the waiting room, he became noticeably more anxious as the actual treatment session began and he confronted the anxiety-inducing stimuli. This experience suggested (and pilot data confirmed) that one way to elevate dental anxiety in the waiting room was to provide subjects with some vivid forewarnings of what their dental treatment would entail. Thus, our high-fear manipulation involved providing informational instructions about the dental procedure to patients in the waiting room. On the other hand, the low-fear group received, instead, an innocuous message regarding everyday dental care. This manipulation permitted random assignment to fear conditions.

A second purpose of Study 2 was to expand the generality of our effect. Thus, rather than focusing again on the illusory correlation phenomenon, we examined the impact of emotion on another instance of superficial processing: the tendency of subjects under certain conditions to attend more to superficial aspects of a persuasive appeal and less to the logic and persuasiveness of the message arguments. This research drew heavily on the work of persuasion theorists such as Petty and Cacioppo (1981, 1986) and Eagly and Chaiken (1984), who specified that persuasive messages are processed carefully under some conditions and superficially under others. Petty and Cacioppo (1986), for instance, drew a distinction between central and peripheral processing of message content. Central processing is an effortful and careful consideration of argument quality and message logic. Peripheral processing represents a less involved, superficial approach which judges a message on such peripheral cues as speaker appearance, audience reaction, humor, and emotional appeals. According to Petty and Cacioppo (1986), peripheral processing is more likely to occur when subjects lack either the motivation or the ability to process material carefully. As noted, there are grounds to suspect that stressful emotion could lower either the ability to process material (according to the reduced-capacity view) or the motivation to do so (according to the attention-allocation view). As a result, our prediction was that negative emotion should increase the likelihood of peripheral processing. Research on fear-arousing messages is loosely supportive of this view (e.g., Leventhal, 1970; Rogers & Mewborn, 1976). Messages that arouse fear have been found to increase persuasion so long as they clearly specify that the position they advocate should alleviate the threat (cf. Petty and Cacioppo, 1981). The fact that fear does not heighten persuasion for more subtle messages is consistent with the notion that fear depletes (or absorbs) the capacity needed to fully process and appreciate such messages. However, since message quality and depth of processing are rarely manipulated or measured in this research, the data are only suggestive.

Likewise, Sanbonmatsu and Kardes' (1988) results are also generally congruent with the idea that emotional arousal leads to superficial message processing but, as noted, that study employed exercise rather than emotion as the source of arousal. As a result, Study 2 examined whether dental stress increased subjects' tendencies to be persuaded by peripheral cues (e.g., audience reaction). Our prediction was that fearful patients would be more likely to be influenced by such peripheral cues while less fearful patients would be more likely to respond to the content of the message. As an additional issue, Study 2 examined the impact of preexisting (initial) patient anxiety (as well as manipulated dental fear) by using initial anxiety as a blocking variable.[5]

STUDY 2

Method

Subjects

Seventeen males and seventeen female patients aged 19 to 75 (M = 45.2) who were scheduled to receive a dental filling from a student dentist at the Junior Operative Clinic at the University of Iowa's College of Dentistry volunteered to participate in this study following telephone recruitment. All patients were receiving a new filling or having an old filling replaced.

Design

Due to the difficulty and slowness we experienced obtaining volunteer clinic patients as subjects in Study 1, Study 2 employed a simplified design involving only a single message. This message contained superficial characteristics that were positive (i.e., strong peripheral cues) but the message's arguments were designed to be specious. Under this circumstance, heightened persuasion would result if subjects attended primarily to the peripheral cues (an effortless form of message processing) but reduced persuasion would occur if subjects were carefully processing the content of the message. Subjects listened to this taped message after first hearing either a graphic description of their upcoming procedure (high-fear condition)

[5]We distinguish between fear and anxiety in this study primarily for purposes of descriptive clarity. As such, anxiety refers to a subject variable assessed with a standard anxiety instrument (i.e., the CAIS) and fear refers to a manipulated variable. In this study we conceptualize these two states as more or less interchangeable negative emotions involving trepidation, avoidance, and dread. In short, we are not emphasizing the distinction made between fear and anxiety in the psychoanalytic literature.

or innocuous filler information (low-fear condition). Thus, Experiment 2 employed a simple two-cell design.

Procedure

The study was conducted 20 to 30 min prior to the subject's dental appointment in the corner of the dentistry waiting room. Most experimental sessions consisted of subjects run individually, although a few sessions involved running subjects in pairs. Half of the sessions were conducted by a male experimenter and half by a female experimenter. After the subject checked in with the receptionist, the experimenter introduced himself/herself, welcomed the subject, and seated the subject so he/she faced the experimenter and the wall in order to minimize distractions. Subjects were told the purpose of the study was to help provide better dental care in the future and the procedures were described.

No subjects refused to participate at this point. After signing the consent form, the subject indicated his/her "initial" level of anxiety on the Corah, Aielezny, O'Shea, Thines, and Mendola (1986) Anxiety Interval Scale (CAIS). On this measure subjects are asked to "mark the scale below to indicate how you feel today just before treatment." The scale in question is a single-item 40-point scale with various verbal descriptors, e.g., anxious, terrified. It is designed specifically as an interval scale of dental anxiety and for this reason was adopted in lieu of the more general STAI used in Study 1.

Fear Manipulation. The subject then donned headphones and was presented with either low- or high-fear instructions. These instructions were equated for length. Since subjects heard these taped instructions, as well as the persuasive message through earphones, the experimenter was able to remain blind to condition. The *low-fear* instructions described the importance of fluoridated water. For example:

> There are a variety of ways you can get the protection of fluoride. One source of fluoride is through drinking water that contains the right amount of fluoride. Fluoridating community drinking water is a safe, economical, and by far the single most effective way to improve dental health.

The *high-fear* instructions graphically described the procedures and sensations that most patients experienced while receiving a filling. Consider the following:

> The injection will be given slowly. . . . The next step is to remove the decayed tooth or replace the old filling using high and low speed drills. The high speed drill, the one with the higher sound, is used to cut through the hard layer of enamel on the outside of the tooth. . . . After the high speed drill has been used, it will

> be necessary to properly shape the tooth with a low speed drill or a very sharp, chisel-like instrument. . . .

The same person delivered the two fear instructions and attempted to keep the tone of each equivalent. Each instruction lasted approximately 2 min. As a manipulation check the instructions were rated by 16 people (aged 17 to 76, $M = 55$) who were sitting in the College of Dentistry's waiting room and who did *not* have a dental appointment the day they participated. These subjects rated how anxious the messages would make them and the average person feel by completing the Corah et al. (1986) Anxiety Interval Scale. These respondents rated the high-fear instructions to be more anxiety provoking for themselves ($M = 8.88$) and for the average person ($M = 13.13$) than the low-fear instructions ($M_{\text{self}} = 4.75$; $M_{\text{average person}} = 6.3$). Both these differences were statistically significant ($t_{\text{self}}(15) = 2.33$, $p = .034$; $t_{\text{average person}}(15) = 4.37$, $p = .001$). These findings are supplemented by data from a subsequent study of dental patients awaiting a root canal procedure. In this study 51 subjects had levels of initial distress that were comparable to the levels reported by our subjects. Twenty-six of these subjects received sensory/procedural information closely modelled on the manipulation described above. This manipulation significantly increased self-reported distress [$F(1, 25) = 6.45$, $p < .02$] while placebo information produced a nonsignificant decrease in distress [$F(1, 25) = 2.95$, n.s.] for the remaining 25 subjects. Thus, specific sensory/procedural information elevated distress in patients just prior to dental treatment. We chose not to check the manipulation with the same sample of subjects used in the present study due to our desire to minimize demand cues that would be quite strong if we assessed anxiety both prior to and following the fear manipulation.

After hearing the fear instructions, subjects in Study 2 were asked to listen to a message. The message topic concerned a possible increase in the state sales tax, an issue then under legislative debate. After listening to either the high or low fear instruction, subjects were told:

> The next message you will hear is one side of a debate about an increase in the Iowa sales tax. What I would like you to do is listen to the debate and pretend you are judging it. Your job is to be fair and objective when listening to it because you will be given some questionnaires concerning it. Go ahead and listen to the debate.

Subjects then heard the sales tax message over earphones. After listening to the recorded message, the research participants indicated their attitude regarding the state sales tax and rated the quality of the message. They then completed a true–false recognition task on the persuasive material, and were fully debriefed and thanked.

Stimulus Message. After hearing the fear manipulation, subjects heard a male speaker arguing against an increase in the state of Iowa's sales tax. As noted above, this message was designed so that the peripheral cues (speaker style, audience reactions) favored the speaker's position while the argument logic and quality actually contradicted the speaker's position. Thus, in his attack on sales taxes, the speaker acknowledged several compelling advantages of sales taxes. He then rebutted these arguments with irrelevant comments, nonsequiturs, and simple statements of belief and affect. Consider the following:

> The people who favor a sales tax tell us that the state needs money to repair roads . . . and maintain medical facilities. Well, I know we have some dangerous stretches of highway. . . . But let's not forget that these things cost a fortune . . . (applause). . . . The sales tax people also tell us . . . that (the sales tax) will allow the state to lower property taxes. . . . Well, all of that may be true, but I say just thinking about another tax makes me mad (applause). (Advocates say) . . . sales tax dollars will be used to maintain fire and police services. . . . Well, I don't know about you, but I am paying enough taxes already and I'm not excited about paying more (applause).

Audience reactions to this message were created by approximately 15 people assembled in a small room who offered a polite round of applause and sporadic supporting comments such as "good" or "yeah" a total of six times throughout the speech. The speaker's final phrase, "Thank you very much," was met with a sustained round of applause interjected with affirming comments. In addition, the speaker adopted a fluid, forceful, and confident demeanor throughout the speech. The entire recording lasted 3.5 min. Thus, while argument quality was purposely designed to be weak, the audience reaction and the speaker's style were peripheral cues which consistently favored message acceptance. A manipulation check confirmed that the message quality was perceived as weak. Eighteen people who were visiting the dental clinic but did not have an appointment and who were similar in age to the real subjects were asked to listen and to evaluate a copy of the sales tax message that omitted the audience's applause. Message quality was assessed by a 4-item index described below that ranged from 4 (poor-quality message) to 36 (high-quality message). As expected, the average message quality rating ($M = 16.6$) was significantly below the midpoint of the scale (20) which denoted "average" quality, $t(17) = -2.58$, $p < .05$, two-tailed.

Dependent Variables

Subjects indicated their *attitude* about an increase in Iowa's state sales tax on a 9-point semantic differential scale (good–bad, harmful–beneficial, wise–foolish, unfavorable–favorable) before evaluating the message. These four items were combined into a single index measuring attitude toward a

sales tax increase. The correlation among these four items ranged from .49 to .74, all $p > .001$. Thus, the overall attitudinal index ranged from 4 (where an increase in the sales tax was perceived as good, beneficial, wise, and favorable) to 36 (where a sales tax increase was seen as bad, harmful, foolish, and unfavorable).

We postulated that subjects experiencing higher levels of fear would be more likely to use peripheral cues such as audience reaction to evaluate the sales tax message. Since peripheral cues were positive, we expected high-fear subjects to react positively to the message. On the other hand, subjects experiencing lower amounts of fear would be more likely to process the message centrally, thereby detecting the flaws in the speaker's comments. In order to assess *message evaluation,* subjects were asked to rate the quality of the persuasive message, using the following 9-point scales: (a) "To what extent did the speaker use intelligent and informative arguments to support his views?" (1 = extremely unintelligent and uninformative, 9 = extremely intelligent and informative); (b) "How well thought out were the speaker's comments?" (1 = very poorly thought out, 9 = extremely well thought out); (c) "From what you heard, please estimate the intelligence of the speaker" (1 = extremely stupid, 9 = extremely intelligent); (d) "How well did the speaker defend his position?" (1 = extremely poor defense, 9 = defended in extremely well); (e) "To what extent was the speaker's comments persuasive?" (1 = not at all, 11 = extremely); and (f) please estimate how fair the speaker was while presenting his topic (1 = extremely unfair, 11 = extremely fair). The midpoint of all scales were labeled *average.* These six items were pooled to form an overall index of message quality. The correlations among these six items ranged from .37 to .91, all $p < .01$, $M = .74$. The memory task consisted of 15 true–false items where subjects indicated if they heard a given statement during the sales tax speech.

Analysis and Results

Subjects scores on the Corah et al. (1986) Anxiety Interval Scale (administered upon arrival) were divided into (relatively) high- and low- anxious groups. The great majority subjects reported only low to moderate levels of initial anxiety with most (85%) scores falling between the *calm* and *slightly nervous* verbal anchors. As a result it seems most appropriate to designate these two groups as low and *relatively* high.[6] Although an attempt

[6]These moderate scores on the CAIS may have been due to underreporting. Another possibility, however, is that, as noted, dental distress may be relatively low for most subjects until they are directly confronted with the stimuli associated with dental treatment. Given that subjects completed the CAIS soon after reporting to the study (dental treatment was some 20 to 30 min in the future), anxiety levels for most may still have been low to moderate.

was made to keep these groups equal in size, it was not possible to achieve perfect proportionality. Those with a score of 3 or lower were placed in the low anxious group (41%). Those with scores of 4 or higher were placed in the relatively high-anxious group (59%). By classifying subjects in this way we were able to block on the variable *initial anxiety,* thereby assessing both the impact of manipulated fear and of the patient's preexisting anxiety on his or her responses. Accordingly the data were analyzed with a 2 (High-/Low-Fear Instructions) × 2 (Relatively High/Low Initial Anxiety) between-subjects ANOVA. When gender was entered as a factor, it produced no main effects or interaction with any of the dependent variables. Moreover, men and women were distributed approximately equally across the various conditions outlined below. Seven men and nine women were classed as relatively high anxious, whereas ten men and eight women were classed as low anxious ($\chi^2 < 1$, n.s.). The high-anxious/ high-fear cell contained five women and three men; the high-anxious/ low-fear cell contained four women and four men; the low-anxious/ high-fear cell contained five women and seven men; while the low-anxious/ low-fear cell contained three women and three men ($\chi^2 < 1$, n.s.). As a result, the analyses reported below collapse across gender.

Likewise, there were no experimenter main effects or interactions with the anxiety or fear factors on any of the dependent variables (lowest $p > .14$) with the exception of a marginally significant tendency ($p < .08$) for subjects to report greater fear with a female experimenter. Given the absence of interactions with treatments, subsequent analyses also collapse over the experimenter factor.

Attitude Change

No significant differences were found on the attitude measure (lowest $p = .36$).

Message Quality

On the six-item message quality index the results showed a nonsignificant tendency for a fear-instruction main effect, $F(1, 30) = 2.68$, $p = .11$. Specifically, although those hearing high-fear instructions tended to rate the message more positively ($M = 4.77$) than those hearing the low-fear instructions ($M = 3.82$), this difference was not significant. Given the low quality of the message, this may represent some evidence of less careful processing by high fear subjects. However, further analyses revealed a Fear-Instruction × Initial-Anxiety interaction, $F(1, 30) = 5.91$, $p = .044$. This interaction is

Table II. Study 2 Argument Quality Ratings[a] by Manipulated Fear and Initial Anxiety

Manipulated fear	Low anxiety	High anxiety	Marginal means
High fear	3.65 (n = 8)	5.90 (n = 8)	4.77
Low Fear	4 44 (n = 6)	3.51 (n = 12)	3.82
Marginal means	3.99	4.46	

[a] Scores can range from 1 to 9 with high scores denoting higher quality. The simple effects between high- and low-fear subjects were as follows: Among low-anxiety subjects, F (1, 30) = .62, n.s.; among high-anxiety subjects, $F(1, 30) = 8.04$, $p < .05$). The ms error to test these effects was 4.06.

depicted in Table II. Followup simple-effects tests compared the effects of fear instructions at each level of initial anxiety. These tests indicated that high-fear subjects significantly differed from low-fear subjects (by offering higher message-quality ratings) only when initial anxiety was relatively high ($F(1, 30) = 8.04, p < .05$). Among those lowest in anxiety there was a trivial reversal of this pattern, $F(1, 30) = .62$, n.s.

Memory Task

Interestingly, there were no differences among conditions on the number of statements correctly recognized as being on the tape (lowest $p > .4$).

Discussion

These results of Study 2 add to those data supporting the view that negative emotionality leads to less elaborate social processing. Specifically, except for those subjects low in initial anxiety, hearing the high-fear instructions led to more charitable evaluations of the (low-quality) message than hearing the low-fear instructions. In retrospect the failure to find this effect among those 40% of patients lowest in initial anxiety is not all that surprising. That is, it seems sensible that graphic descriptive information about stressful medical/dental procedures should induce relatively greater fear among patients who are already somewhat anxious about such procedures and relatively little stress among those who are particularly sanguine about this treatment. These results do suggest, however, that manipulating fear in a naturalistic clinic setting is a complex issue that requires careful

attention to patient characteristics. Another caveat is that, unlike Study 1, in Study 2, initial anxiety, as measured by the CAIS, did not have a main effect on superficial processing. This seems attributable to the fact that, in Study 2, subjects generally reported very moderate levels of initial anxiety even in the high-anxiety group (see footnote 6). It is hard to determine if this is due to imprecision in this anxiety measure or to a genuine low level of overall anxiety in this sample of patients, but either of these explanations would account for the weak impact of initial anxiety on message evaluation. (*Note*: Subjects in Study 2 were quite comparable to those in Study 1 regarding age, gender composition, method of recruitment, and dental treatment history.) As a final caution, although our primary prediction was one of superficial processing rather than differential attitude change, admittedly our data would have been even more compelling had fear level affected our subjects' attitudinal position as well as their message ratings. It is possible, however, that our instructions to subjects to act as debate judges somehow inhibited attitude change. For example, subjects may have been attending so closely to source evaluation (their primary task) that they failed to consider the implications of the speaker's arguments for their own opinions. This seems plausible given the short time period between message exposure and attitude assessment (i.e., less than 2 min).

These caveats aside, we feel the interaction pattern depicted in Table II to be generally congruent with the hypothesis that negative emotional states trigger less careful processing. That is, given that the superficial cues of the message (i.e., speaker style, audience response) favored the speaker while argument quality did not, these data imply that relatively anxious subjects hearing the high-fear instructions were basing relatively more of their judgments on the more superficial aspects of the message and/or not carefully considering the key arguments of the message. Furthermore, the data suggest that these differential evaluations are not due to differences on memory but perhaps to the inability to integrate the incoming arguments with prior knowledge. These memory data complement several other reports that superficial message processing does not necessarily impair message reception (e.g., Petty, Cacioppo, & Goldman, 1981; Petty, Wells, & Brock, 1976). Rather, peripheral processing seems to inhibit the extent to which message reception provokes thoughtful consideration of message content on the part of the audience. In short, these data indicate that dental clinic patients awaiting dental treatment respond to stressful manipulations as do subjects in nonclinical laboratory settings (e.g., Kim & Baron, 1988; Sanbonmatsu & Kardes, 1988). Specifically, high-stress manipulations lead to less careful processing of stress-irrelevant stimuli.

These results are complemented by several recent reports that negative emotional arousal leads to less thoughtful processing even when the material to be processed is relevant to the source of stress. First, Jepson and Chaiken (1990) found, in a correlational study, that chronic fear of cancer was negatively associated with the ability to detect logical errors in a message about cancer prevention. Second, Gleicher and Petty (1992) found that moderate fear of crime did not lead to careful processing of a message regarding a crime-prevention program if, prior to the message, an expert endorsed the program as effective. In contrast, low-fear subjects responded differentially to strong and weak messages about crime prevention, regardless of expert endorsement. In short, moderate-fear subjects appeared to respond more to an available peripheral cue (the expert's endorsement) than did low-fear subjects. This is quite congruent with the notion that the moderately fearful subjects were less motivated to process the message material carefully than were nonfearful subjects.

GENERAL DISCUSSION

It appears that the evidence on message processing nicely parallels the evidence on schematic biases. In both cases, what appears to be superficial social processing is enhanced both by negative emotional states (Studies 1 and 2; Gleicher & Petty, 1992; Jepson & Chaiken, 1990) and by manipulations of physiological arousal (Baron & Moore, 1987; Kim & Baron, 1988; Sanbonmatsu & Kardes, 1988). Moreover, Wilder and Shapiro (1988) also report data that support our general contention that negative emotional arousal causes an increase in superficial social processing. Wilder and Shapiro demonstrated that subjects exposed to laboratory stress (induced by such manipulations as the threat of shock or giving an embarrassing speech) were more likely to see a deviant in a discussion as similar to his peers than were nonstressed subjects. Thus, negative emotional manipulations increased the likelihood that subjects would rely more on an individual's category membership than on his or her individual behavior when making judgments about him/her.

In short, we feel there is converging evidence for our primary hypothesis that various forms of negative emotional arousal increase slipshod social processing. Furthermore, we feel that our data extend prior research in two ways. First, our studies examined the effects of a naturalistic stressor. One common criticism of laboratory-induced stressors involving human subjects is that the subjects realize the restraints placed on experimental manipulations. Our studies avoided this problem by utilizing a nonlab stressor that triggered a high degree of trepidation and distress in a substantial segment of the population (Milgrom, Fiset, Melnick, & Weinstein, 1988).

Second, Study 2 integrated a random assignment procedure into this naturally occurring stressful setting.

Unfortunately the data from the present research do not permit us to delineate whether negative emotion produces less careful social processing because stress leads to overall capacity depletion (i.e., low ability as per the reduced-capacity view) or because individuals under stress decide to allocate a disproportionate share of capacity to appraisal and coping (as per the attention-allocation view). The latter view suggests that stressed subjects could, in fact, process experimental material far more carefully should they be motivated to allocate capacity for such processing. In the present research the only data tentatively favoring the attention-allocation view is that message recall was not lower in the higher-fear condition. However, this is a null effect; moreover, it is possible that simple message encoding and recognition may not demand much capacity, especially compared to message elaboration (i.e., thinking about the message's adequacy, implications, and trustworthiness). As a result, overall capacity might well be reduced and yet message recall not be dramatically affected. As such, the memory data hardly seem definitive.

On the other hand, the data reported by Gleicher and Petty (1992) lend more substantial support to the attention-allocation perspective. As noted, Gleicher and Petty found evidence of superficial processing among moderately fearful subjects even on messages relevant to their fear. Specifically, such subjects did not discriminate between strong and weak messages if a strong peripheral cue (an expert's endorsement) was present. However, when this cue was absent, moderately fearful subjects did, in fact, react differentially to strong and weak arguments. Thus, they were capable of more careful processing when peripheral cues were not readily available.

This, of course, suggests that the less careful processing in the "expert endorsement" condition stemmed more from an attention-allocation decision than from an overall depletion of capacity. If these findings are replicated with stronger stress-related manipulations, it would represent compelling evidence that attention-allocation is, at least, a partial cause of the link between negative emotion and superficial processing.

An additional point is that the research reviewed just above linking negative emotional arousal to superficial social processing appears to run counter to recent assertions in the mood literature that negative mood should *decrease* such processing and instead *increase* systematic processing (e.g., Bless, Bohner, Schwarz, & Strack, 1990; Schwarz, 1990). Such effects are presumed to occur because of subjects' desires to distract themselves from their unpleasant mood states (cf. Erber & Tesser, 1992). First, it is possible that such effects do occur with mild and/or chronic dysphoria but

that more acute and severe negative affectivity depletes (Walley & Weiden, 1973) and/or absorbs capacity (Lazarus, 1981), thus producing the type of effects reported here in Studies 1 and 2. Stated differently, writing about sad past events in one's life (Bless et al., 1990) seems unlikely to trigger the type of physiological responses or appraisal and coping demanded by such events as dental treatment (Studies 1 and 2), electric shock or public embarrassment (Wilder & Shapiro, 1988). Thus, assertions regarding mild negative mood states may not apply to more intense negative emotions.

A second point is that the data linking negative mood to more careful social processing are tentative. Erber and Tesser (1992) reported that subjects in a negative-mood condition felt better after engaging in task activity (consistent with the negative mood-distraction view); but this study was not designed to assess if negative mood improved task-relevant processing. Bless et al. (1990) reported that subjects exposed to a sad-mood induction had more favorable cognitive and attitudinal responses to a strong message than to a weak message (regarding student fees). Subjects in a good-mood condition, in contrast, were equally persuaded by strong and weak arguments. These data are consistent with the idea that the sad-mood condition induced more careful message processing than the good-mood condition. Unfortunately, it is not clear whether these data reflected the effect of the bad-mood induction, the good-mood induction, or both. That is, the study did not examine how messages are processed in a neutral-mood condition. Without this baseline control, one cannot determine whether good mood was decreasing careful message processing or sad mood was enhancing it in this study. A second problem is that, as the authors noted, the bad-mood induction did not have a dramatic effect. Sad-mood subjects rated their moods to be slightly *above* the neutral point of the mood scale. Thus, this study seemed to be comparing the effects of a neutral (or slightly positive) mood to that of a good mood. For these reasons the Bless et al. 1990 data did not represent definitive evidence that negative mood increases careful processing. While it seems possible that mild forms of negative affect may have such effects, the data on this point are, at best, suggestive. On the other hand, the studies reviewed earlier in this section indicated that there is a good deal of converging evidence that stronger forms of negative affect heighten superficial rather than careful processing.

These findings are important both theoretically and empirically. First, they are relevant to important questions regarding social cognition, for example, delineating when individuals are most likely to employ schemata, heuristics, and other simplifying strategies. Recent writers (e.g., Petty & Cacioppo, 1986; Sherman & Corty, 1984) have suggested that factors such as overload, low involvement, and high expertise will increase the use of simplifying strategies. The present data indicate that negative emotional

arousal also produces such effects. In addition, the data are quite consistent with those models of attitude change which postulate that capacity-related variables will affect the nature of message processing (Eagly & Chaiken, 1984; Petty & Cacioppo, 1986). For example, according to the elaboration likelihood model of persuasion, whether or not one processes a message centrally (i.e., carefully) or peripherally (i.e., superficially) is a function of one's motivation and ability to think carefully about the issues raised by the persuasive attempt. Since a good deal of data indicates that arousal limits the attentional capacity available for stress-irrelevant processing (whether resulting from an allocation decision or a general depletion of capacity), the elaboration likelihood model predicts that subjects would be more influenced by peripheral cues in arousing situations. This is precisely the effect reported in Study 2.

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