
Thinking Straight While Seeing Red: The Influence of Anger on Information Processing

Wesley G. Moons

Diane M. Mackie

University of California, Santa Barbara

Because angry people apparently rely on heuristic cues when making judgments, anger has been claimed to trigger superficial, nonanalytic information processing. In three studies, the authors found that induced anger promoted analytic processing. Experiment 1 showed that angry participants were more likely to discriminate between weak and strong arguments than participants in neutral moods. Experiment 2 demonstrated that anger overrode dispositional preferences not to process, causing even those low in need for cognition to process analytically. Experiment 3 reconciled these findings with previous work by showing that angry people used accessible, valid, and relevant heuristics but otherwise processed analytically, as indicated by attitude change and elaboration data. Together, these experiments showed that angry people can have both the capacity and motivation to process and that their selective use of heuristics reflects the cue's perceived validity and not the failure to process analytically.

Keywords: *anger; information processing; attitude change; emotion; mood*

Anger is that powerful internal force that blows out the light of reason.

—Ralph Waldo Emerson

Nothing good seems to come from anger. Anger appears to dangerously alter perceptions of risk (Fischhoff, Gonzalez, Lerner, & Small, 2005; Lerner & Keltner, 2001), distort likelihood estimates (DeSteno, Petty, Rucker, Wegener, & Braverman, 2004), place an attentional premium on anger-related information (Parrott,

Zeichner, & Evces, 2005), decrease trust (Dunn & Schweitzer, 2005), increase stereotyping and prejudice (Bodenhausen, Sheppard, & Kramer, 1994; DeSteno, Dasgupta, Bartlett, & Cajdric, 2004), and trigger hostility and aggression (Baron, 1977; Berkowitz, 1993; Geen, 1995). And the root of all this evil? The popular view, reflected in Emerson's quote, is that anger has destructive consequences at least in part because angry people do not process information carefully, fully, or rationally. Despite the evidence that anger biases thinking in certain ways, however, there is little direct empirical evidence regarding the impact of anger on the quality or quantity of information processing. The experiments reported here used a dual-processing framework to directly investigate whether anger impedes information processing.

Dual-process models provide a framework for thinking about how anger might influence information processing (see Sloman, 1996; Smith & DeCoster, 2000, for reviews). Although models differ significantly, many converge on the idea that individuals can make judgments about identical information based on two distinct modes of processing. Analytic processing is characterized by effortful, deliberate, and meticulous scrutiny and evaluation of information content. Because analytic processors

Authors' Note: This research was supported by National Research Service Award MH070355 to Wesley Moons and Public Health Service grant MH63762 to Diane Mackie. Correspondence regarding this article should be addressed to Wesley Moons, Department of Psychology, University of California, Santa Barbara, Santa Barbara, CA 93106-9660; e-mail: moons@psych.ucsb.edu

PSPB, Vol. X No. X, Month XXXX xx-xx

DOI: 10.1177/0146167206298566

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attend to message content, judgments are sensitive to variations in information quality. In contrast, nonanalytic processing is characterized by a quicker and less effortful consideration of information. Judgments resulting from it are less likely to reflect the merits of informational content and more likely to reflect the evaluative implications of associations or heuristics activated by the information or its context (such as stereotypes, schemas, or heuristics; Smith & DeCoster, 2000).

How might anger influence analytic or nonanalytic processing? Because analytic processing requires both motivation and capacity (Eagly & Chaiken, 1993; Petty & Cacioppo, 1986; Petty & Wegener, 1998), any motivational or capacity consequences of anger will have concomitant effects on processing. Such motivational and capacity constraints have been offered as possible explanations for the results of the studies most widely cited regarding the effects of anger on processing.

Bodenhausen et al. (1994) conducted three experiments investigating anger's impact on cognition. In Experiment 1, neutral, sad, or angry states were induced by a guided writing exercise in which participants described either their activities from the day before or a personal event that induced either sadness or anger. Acting as members of a judicial review board, participants then evaluated a case of either assault or academic dishonesty. Participants also received information about the alleged suspect: he was either White or Hispanic in the assault case and either a nondescript student or an athlete in the academic dishonesty case. The suspect's group membership provided a heuristic basis for judgments of guilt. Results revealed that across the two cases, the presence of stereotypic information did not affect neutral or sad participants' judgments of guilt. However, angry participants were more likely to assign guilt to the Hispanic assault suspect and the athletic cheating suspect.

In Experiment 2, neutral, sad, or angry participants read a persuasive message that advocated an unpopular rise in the legal driving age from 16 to 18. Whereas neutral and sad participants were uninfluenced by the source of the message, angry participants agreed less with a message written by "a group of students at Sinclair Community College in New Jersey" than with a message written by "a group of transportation policy experts at Princeton University." Again, angry participants seemingly relied on source credentials as a heuristic means of evaluating the persuasive message. In Experiment 3, participants read another message advocating the banning of meat in the residence hall dining rooms. Some participants saw the message attributed to a supposedly objective and honest source: the "Student Government League, which actively promotes the interest and welfare of all college students." In contrast,

other participants were told the message originated from the apparently biased and self-interested "Student Vegetarian League, which actively promotes vegetarianism and animal rights." Once again, neutral and sad participants were insensitive to the source of the message. Angry participants, however, agreed less with the untrustworthy vegetarians and more with the trustworthy Student Government League.

All three studies showed angry information processors to be more influenced by heuristic cues than sad or neutral processors. In explaining these results, Bodenhausen et al. (1994) cautiously attributed this anger-induced lack of analytic processing to "reduced motivation for thoughtful analysis of judgment-relevant information, reduced capacity for such analysis, or something else" (p. 59). Regardless of cause, this increased reliance on cues has commonly been interpreted as indicating limited information processing: Angry people do not process analytically (Forgas, 1995; Lerner, Goldberg, & Tetlock, 1998; Ric, 2003; Russell, 2003).

Although Bodenhausen et al. (1994) were careful not to specify an underlying mechanism for the effect, reduced capacity and reduced motivation are both good candidates. After all, anger is typically physiologically arousing (Henry, 1986), and high levels of physiological arousal purportedly reduce cognitive capacity and promote nonanalytic processing by either inhibiting cortical function (Walley & Weiden, 1973), diverting attention to physiological symptoms (Mandler, 1975), or engaging complex appraisal and coping processes that consume cognitive resources (Lazarus, 1981; Schachter, 1964). Thus, anger-related arousal reduces capacity and may limit angry people's ability to process analytically.

Anger might also induce motivational states incompatible with analytic processing. Extending appraisal-theory views on emotions' effect on information processing (Roseman, 1984; Scherer, 1982; Smith, 1989; Smith & Ellsworth, 1985; Smith & Lazarus, 1993), Tiedens and Linton (2001; see also Smith & Ellsworth, 1985) have characterized anger as a high-certainty emotion. If anger induces a high degree of certainty, judgments might appear obvious to the angry person: Judgments can be confidently rendered with minimal processing. Consistent with this view, Tiedens and Linton showed that compared to those low in certainty, people experiencing high certainty while feeling anger (or contentment) relied on an expertise source cue when judging a persuasive appeal. Although the independent effect of anger was not distinguished from that of contentment, the results were consistent with higher levels of anger-induced certainty promoting nonanalytic processing.

Other motivational accounts of the impact of mood and emotion, however, suggest quite opposite outcomes. The affect-as-information model (Schwarz,

1990) proposes that affect reflects the environment's hospitability. Positive affect indicates an innocuous environment and encourages minimal processing and conservation of cognitive resources for when they are really needed. In contrast, negative affect signals a hostile environment and triggers effortful, thorough processing to deal with potential threats or problems. The implication for anger is clear. Like other negative emotions, anger indicates problems or perils and therefore should elicit analytic processing to cope with them.

Hedonic-contingency theory (Wegener & Petty, 1994) similarly suggests increased anger-induced processing. According to the model, the desire to improve negative and maintain positive moods drives strategic processing choices that attain those goals. For people in negative moods, odds favor analytic processing. Careful processing of negative information will do no worse than maintain a negative mood, and deliberative processing of positive information will ameliorate mood. People in negative moods—such as anger—therefore maximize their chances for mood enhancement by analytically processing all information. Support for this proposition has been found for those experiencing sadness (Wegener, Petty, & Smith, 1995), but the implications for anger seem equally clear—hedonic motivations should privilege analytic processing.

Some suggestive but tentative evidence supports motivational accounts of anger-induced analytic processing. To study the effect of affect as information on attitudes and behavior, Albarracín and Kumkale (2003; Albarracín & Wyer, 2001) induced happy and angry processors to read weak or strong arguments supporting a counterattitudinal advocacy. No interactions of emotion with argument strength on attitudes were found, indicating that both angry and happy people processed similarly. Close inspection of the results reveals large and significant main effects for argument quality in all key conditions: Both angry and happy participants apparently processed analytically and differentially responded to argument quality, except when both ability and motivation were experimentally constrained (conditions that prevent analytic processing). Thus, angry people apparently processed analytically unless both their capacity and motivation were constrained. However, because these studies were not designed to focus on the impact of emotion on information processing, because the null effects of the induced emotions on processing are difficult to interpret, and because anger was induced in these studies specifically because it was assumed to induce heuristic processing, no definitive conclusions relevant to our hypotheses can be drawn from these findings.

Thus, there seem to be equally compelling reasons to think that anger might enhance processing or impede it.

Although Bodenhausen et al. (2004) are typically cited as demonstrating that anger impedes processing, such a conclusion is difficult to draw from angry peoples' cue usage alone. First, because there was no independent manipulation of information content in these studies, it is not clear whether angry people were processing message content carefully or not. Second, because cue usage and analytic processing are not mutually exclusive, evidence for the presence of one does not definitively rule out the other (Chaiken, 1987; Chaiken, Liberman, & Eagly, 1989; Kruglanski & Thompson, 1999, Petty & Cacioppo, 1986). Finally, because heuristic cues can sometimes work in concert with message content, use of both message content and relevant cues might produce a pattern of additive results (Chen & Chaiken, 1999).

Thus, it seems important to verify whether anger enhances or impedes processing in a paradigm in which independent manipulations of information quality and cue availability can be used to diagnose the presence of both analytic processing and nonanalytic processing. No experimental test has been specifically designed to verify the hypothesis that angry people are willing and able to process analytically, a surprising omission given the motivational approaches that might predict it.

EXPERIMENT 1

In Experiment 1, participants who either were or were not angry read a persuasive communication composed of either specious or compelling arguments. To ensure construct validity and generalizability across operationalizations, two different emotion-induction procedures were used to elicit angry as compared to neutral emotional states. One induction used false interpersonal feedback to induce anger: Participants' life goals were or were not (ostensibly) harshly criticized by a fellow participant (following McCoy, 2004; McCoy & Major, 2003). The second induction was the commonly used guided-writing exercise: Participants reported relevant personal events to re-activate anger or neutrality (Bodenhausen et al., 1994; DeSteno et al., 2004; Lerner & Keltner, 2001; Lerner & Gonzalez, 2005; Strack, Schwarz, & Gschneidinger, 1985; Tiedens & Linton, 2001). Whether they were interpersonal or intrapersonal, or referenced the past or present, both techniques were expected to provoke anger.

To diagnose the presence or absence of analytic processing, we used a well-established paradigm in which information quality is manipulated by presenting either weak or strong arguments to advocate a counterattitudinal position (see Petty & Cacioppo, 1986, for review). Because people processing analytically attend to the

content of the message, their evaluative responses (attitudes toward and acceptance of the advocacy, for example) discriminate between weak and strong arguments for it. In contrast, people not processing analytically typically examine the message so superficially that they are insensitive to argument quality. This paradigm is well suited to detecting analytic processing because differentiating between weak and strong arguments requires consideration of the merit of message content.

We used this paradigm to test two possible impacts that anger might have on information processing. If non-analytic processing underlies angry people's greater reliance on heuristic cues, as suggested by arousal theory and by some motivational accounts, then angry people were expected to differentiate weak and strong message content less than neutral processors. If, however, angry people's emotional state actually motivates processing, as suggested by the mood-as-information and the hedonic-contingency models, then angry processors were expected to discriminate between weak and strong arguments more than participants in a neutral mood. Thus, the critical test of anger's influence on information processing is whether angry participants distinguish between specious and compelling arguments.

METHOD

Participants and Design

Participants were 157 undergraduates (37 men, 120 women) participating in exchange for course credit. Participants were randomly assigned to a 2 (induction: negative feedback or guided writing) \times 2 (emotion: anger or neutral) \times 2 (argument quality: weak or strong) factorial design.

Procedure

Participants ostensibly participated in two unrelated experiments. The first was the emotion induction and supposedly concerned either "goal planning" or "event memory," depending on which emotion induction participants received. The second study purportedly tested experimental materials for future use.

Manipulations of Emotion

Two manipulations of emotion were used. The first involved insulting feedback to induce anger. Following McCoy (2004), participants wrote for 6 min about their own future hopes and dreams and were then asked to provide an "open and honest" written evaluation of a goal essay ostensibly written by another participant

(while another participant supposedly evaluated their essay). All participants then read a harsh critique of an essay that insulted in detail the essay's author as boring and uninteresting. Participants in the neutral condition were told that the feedback was written about an essay from a previous experimental session. Participants in the anger condition were told that the feedback was about the goal essay they had just written. Thus, participants in both conditions were exposed to equally negative information, but the information constituted a personal insult in the anger condition.

The second emotion induction was the commonly used guided writing exercise. Following Bodenhausen et al. (1994), participants in the neutral condition were asked to remember, relive, and vividly recall the activities they performed yesterday. Participants in the anger condition were asked to remember, relive, and vividly recall an event that made them feel extremely angry. Participants were given 6 min to write their experiences.

Manipulation of Argument Quality

Ostensibly as part of an unrelated experiment intended to test stimulus materials, participants were then given a half-page-long persuasive message composed of either weak or strong arguments advocating the counterattitudinal position that college students have good financial habits (see the appendix).¹

Dependent Measures

Attitude Index. Three items assessed attitudes toward the advocated position. Participants reported how financially responsible they thought college students were on a scale from 1 (*very irresponsible*) to 7 (*very responsible*). Participants reported how much they agreed with the position taken in the message on a scale from 1 (*disagree strongly*) to 7 (*agree strongly*). Last, participants reported how convinced they were by the message on a scale from 1 (*very unconvinced*) to 7 (*very convinced*). These three items were averaged into an attitude index ($\alpha = .77$).

Effectiveness of the manipulation of emotion. Participants then reported the extent to which they were experiencing each of 20 common emotions.² Participants used either a 5- or 7-point scale anchored by *not at all* and *extremely*, and resulting scores were standardized to equate the two different scales.³ To check the effectiveness of the manipulation of emotion, an Anger Index was created by averaging how irritable, distressed, hostile, and upset participants reported feeling ($\alpha = .80$). Upon completion, participants were carefully debriefed and excused.

RESULTS AND DISCUSSION

Effectiveness of the Manipulation of Emotion

We verified the successful manipulation of emotion by subjecting the Anger Index to a 2 (induction) \times 2 (emotion) \times 2 (argument quality) between-subjects ANOVA. The expected main effect of emotion condition emerged despite the fact that participants reported their current emotions long after the manipulation was completed, $F(1, 149) = 8.93, p < .01$. People in the neutral condition reported experiencing significantly less anger ($M = -0.19$) than did people in the anger condition ($M = 0.19$). There was no main effect for the type of induction technique used, indicating that both well-established techniques were equally effective in eliciting anger.

Attitude Index

To investigate the impact of anger on processing, we subjected the Attitude Index to a 2 (induction) \times 2 (emotion) \times 2 (argument quality) between-subjects ANOVA. There was a main effect of induction such that participants in the negative feedback condition evaluated both weak and strong messages less favorably ($M = 4.21$) than participants in the guided-writing condition ($M = 4.61$), $F(1, 148) = 5.04, p < .05$.

Of most theoretical importance, a significant emotion by argument quality interaction emerged, $F(1, 148) = 6.59, p < .05$ (see Figure 1). Consistent with the idea that nonanalytic processing often operates as a default (Bargh, 1994; Fiske & Taylor, 1991), neutral participants expressed similar attitudes after reading the weak ($M = 4.46$) or strong ($M = 4.29$) message, $F < 1$. In contrast, angry participants had less favorable attitudes after reading the weak message ($M = 3.56$) than after reading the strong message ($M = 4.68$), $F(1, 148) = 12.17, p = .001$. Angry people thus successfully discriminated between weak and strong message content, an outcome indicative of analytic processing.

Results from Experiment 1 demonstrated that angry people can and will process analytically. In this context, neutral participants evaluated weak and strong messages similarly, indicating little message-content processing. In contrast, angry participants considered message content thoroughly and differentiated between weak and strong arguments, consistent with analytic processing. This pattern of results emerged across two very different anger inductions, bolstering the claim that elicited anger was indeed the factor activating analytic processing. This finding directly contradicts the notion that angry people cannot or will not process analytically. In fact, these results demonstrate that anger can actually enhance processing.

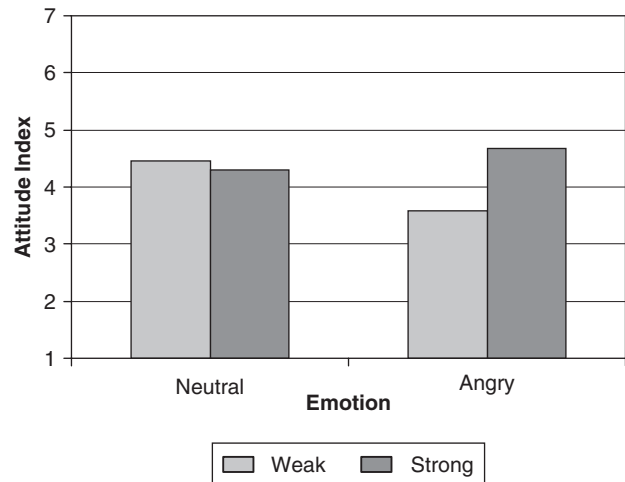


Figure 1 Mean Attitude Favorability as a Function of Emotion and Argument Quality in Experiment 1

One reason angry people may have processed carefully, however, was the positive tone of the information we presented. Although counterattitudinal, the message advocated a position quite complimentary about the participants' membership group: Students are indeed fiscally responsible. Recall that hedonic-contingency theory predicts that those in negative moods would be both particularly likely to benefit from carefully processing positive or uplifting material (Wegener & Petty, 1994). Thus, our angry participants might have been motivated to regulate their mood by carefully processing this pleasant information.

EXPERIMENT 2

We thus sought to replicate these effects under even more conservative conditions. First, to avoid the possibility that the positive content of the financial persuasive message was responsible for angry participants processing analytically, we switched to the commonly used weak and strong messages arguing for the implementation of comprehensive exams (Petty & Cacioppo, 1986). Not only have these messages been shown on numerous occasions to detect systematic and elaborative processing (Cacioppo & Petty, 1989; Petty & Cacioppo, 1986; Petty, Cacioppo, & Goldman, 1981), but the advocacy of implementing comprehensive exams is both counterattitudinal to this college population (Claypool, Mackie, Garcia-Marques, McIntosh, & Udal, 2004) and disagreeable to read about.⁴

Second, because our results suggested that anger might enhance analytic processing, we attempted to

replicate this effect with a population dispositionally unlikely to process. The Need for Cognition (NFC; Cacioppo & Petty, 1982) Scale assesses dispositional preferences for engaging in thought with 18 diagnostic items (e.g., “I would prefer complex to simple problems”). Lower NFC individuals routinely engage in nonanalytic processing, whereas their higher NFC counterparts routinely engage in more analytic processing. We therefore expected low-NFC individuals in neutral moods to process nonanalytically (failing to differentiate weak and strong messages) but high-NFC individuals in neutral moods to process analytically (distinguishing the two advocacies). We thus produced conditions for a strong test of the impact of anger on processing. By examining the effect of anger on low-NFC individuals, we could see whether anger overrode this dispositional preference and triggered analytic processing. By examining the reactions of high-NFC individuals, we could see if anger impeded processing.

Based on findings from Experiment 1, we expected anger to increase analytic processing. We therefore hypothesized that low-NFC individuals in neutral moods would engage in little analytic processing, but low-NFC individuals who were angry would process analytically. In contrast, we expected those high in NFC to process analytically regardless of emotional state. That is, we did not expect anger to impede processing.

METHOD

Participants and Design

Participants were 119 undergraduates (42 men and 77 women) participating in exchange for course credit. Participants were randomly assigned to a 2 (emotion: neutral or angry) \times 2 (argument quality: weak or strong) factorial design. Participants' NFC scores served as a predictor.

Manipulation of Emotion

Emotion was manipulated using the guided-writing induction described in Experiment 1. The neutral group reported yesterday's activities, whereas the angry group reported a personal experience during which they felt extremely angry.

Manipulation of Argument Quality

Participants were presented with either a weak or strong version of a half-page-long message advocating the introduction of mandatory comprehensive exams as a graduation requirement for college seniors (Petty & Cacioppo, 1986).

Dependent Variables

Attitude Index. The three-item Attitude Index was the same as in Experiment 1 except participants indicated their agreement with the statement “UCSB [University of California, Santa Barbara] should have a system of comprehensive exams.” These three items were averaged into a single Attitude Index ($\alpha = .84$).

Effectiveness of the manipulation of emotion. Participants were asked to report how much they currently felt each of 26 emotions on a scale from 1 (*not at all*) to 7 (*extremely*). An Anger Index was created by averaging how angry, annoyed, frustrated, hostile, irritable, and mad they felt ($\alpha = .88$).

Need for cognition. Participants completed the NFC Scale by indicating how personally characteristic each statement was using a scale from 1 (*extremely uncharacteristic*) to 5 (*extremely characteristic*). After half the items were reverse scored so that higher values indicated higher NFC, all 18 items were averaged into a NFC Index ($\alpha = .89$). Participants were then carefully debriefed and excused.

RESULTS AND DISCUSSION

Effectiveness of the Manipulation of Emotion

To verify the effectiveness of the manipulation of emotion, the Anger Index was entered as the criterion in a hierarchical regression analysis with emotion, argument quality, and centered NFC as predictors at Step 1, all possible two-way interactions entered at Step 2, and the three-way interaction entered at Step 3. As expected, participants in the neutral condition reported less anger than participants in the angry condition, $\beta = .20$, $t(112) = 2.23$, $p < .05$. Once again, this effect emerged despite participants reporting their feelings long after the manipulation was completed. No other effects emerged.

Attitude Index

An identical hierarchical regression was conducted with the Attitude Index as the criterion. A main effect of argument quality emerged, with the weak message evaluated less favorably than the strong message, $\beta = .552$, $t(115) = 7.09$, $p < .001$. The argument quality by NFC interaction was also significant, $\beta = .283$, $t(112) = 2.76$, $p < .05$, as was the emotion by argument quality interaction, $\beta = .276$, $t(112) = 2.10$, $p < .05$.

Both of these interactions were qualified by the theoretically relevant significant three-way interaction among emotion, argument quality, and centered NFC,

$\beta = -.349$, $t(111) = -2.02$, $p < .05$. As illustrated in Figure 2, low-NFC participants in the neutral condition did not differentiate between weak and strong arguments, $\beta = .003$, ns . However, low-NFC participants in the angry condition did successfully differentiate between weak and strong arguments $\beta = .622$, $t(111) = 4.31$, $p < .001$. As in Experiment 1, anger triggered analytic processing. Participants high in NFC, on the other hand, differentiated between weak and strong messages regardless of whether they were in neutral or angry states, $\beta = .782$, $t(111) = 4.90$, $p < .001$. In these cases, the internal motivation to engage in thought drove analytic processing, and this motivation was unabated in angry processors. Taken together, then, these results show both that anger can increase analytic processing and that anger need not decrease analytic processing.

Experiment 2 replicated the finding that angry people—even those who habitually choose not to process analytically—clearly discriminated the content of weak and strong persuasive messages. This was true even when the information they processed was both counterattitudinal and unpleasant in its consequences, making it unlikely that the results of Experiment 1 were due solely to the positive content of the financial-responsibility message. It is important that the processing that angry participants exhibited looked just like the processing exhibited by neutral participants who were dispositionally likely to process and who detected the relative merits of strong and weak arguments as expected.

EXPERIMENT 3

Across two different manipulations of anger and two different persuasive messages, our findings converge to show that anger triggers analytic processing. How can such findings be reconciled with earlier work showing that angry people rely on heuristic cues more than people in neutral states (Bodenhausen et al., 1994)? If angry people are both capable of and motivated to analytically process, it may be that their reliance on cues (especially when information itself is not discriminating) reflects a systematic scrutiny and consideration of the merits of available cues. This is of course consistent with definitions of analytic processing as involving the deliberative evaluation and appropriate use of all judgment-relevant information (Chaiken et al., 1989; Chen & Chaiken, 1999; Petty & Cacioppo, 1986; Petty & Wegener, 1998). An example of such selective cue use as part of an analytic processing strategy comes from a study of the impact of sadness on stereotype use and correction (Lambert, Kahn, Lickel, & Fricke, 1997, Experiment 3). In this study, sad individuals (who routinely

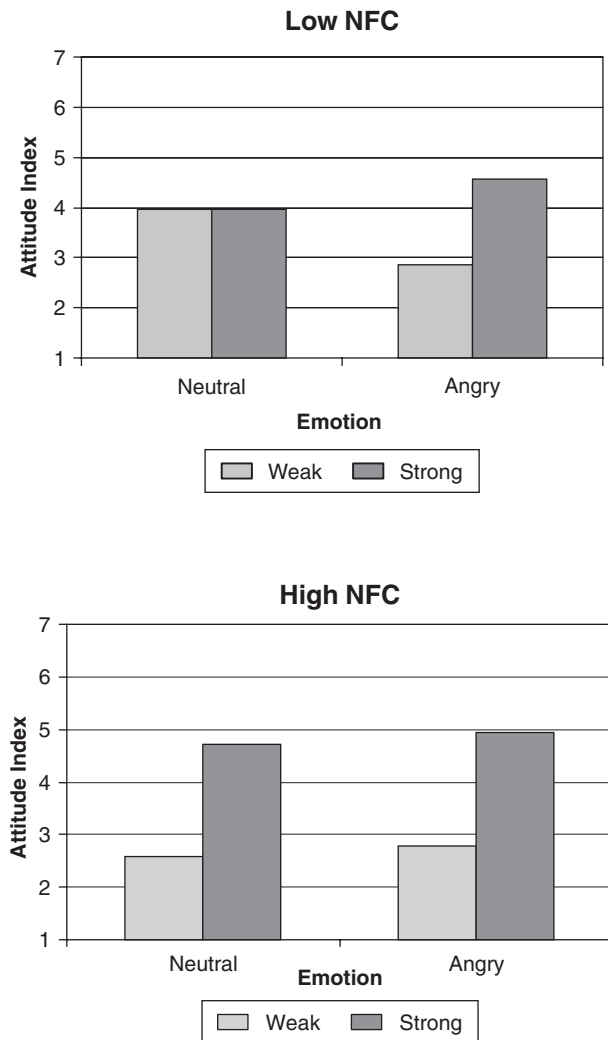


Figure 2 Mean Attitude Favorability as a Function of Emotion, Argument Quality, and Centered Need for Cognition in Experiment 2

NOTE: NFC = need for cognition. Means are graphed at 1 standard deviation below and above the NFC mean.

process analytically; Bless, Bohner, Schwarz, & Strack, 1990; Tiedens & Linton, 2001), used the “what is beautiful is good” heuristic to make hiring decisions, but only when the heuristic seemed appropriate for the target judgment. That is, sad participants were influenced by the candidate’s appearance only when attractiveness, as opposed to skill and efficiency, was framed as an important criterion for a flight attendant position. Thus, instead of suggesting that angry people’s reliance on cues is caused by limited information processing, we propose that as part of their analytic strategy, angry people examine and evaluate whether cues are valid sources of information.

If no cues were present (as in Experiments 1 and 2), or if a cue was regarded as invalid, angry processors' judgments might reflect just the content of the message (as in Experiments 1 and 2). On the other hand, if an available cue is regarded as a valid and relevant piece of information, angry people might use it in their overall judgment. Recall that Bodenhausen et al. (1994; Experiments 2 and 3) demonstrated angry participants' increased reliance on source cues compared to neutral and sad participants. In both experiments, angry and neutral processors saw the same persuasive message accompanied in one case by a cue that might increase message acceptance and in the other a cue suggesting the message should be rejected. In both cases, the available cues were arguably quite informative for the judgment at hand. In considering an argument for increasing the driving age from 16 to 18, for example, it might well be rational to assume that transportation policy experts knew what they were talking about, whereas the community college student source might have detracted from the message. Similarly, the obvious self-interest of the vegetarians and the equally obvious bipartisan interests of the Student Government League might both have seemed rationally relevant to enhancing or undermining the presented information about whether meat should be banned from dining halls. Especially if cues are the only factors that differentiate two persuasive appeals (as in Bodenhausen et al.'s experiments), then judgments that reflect the presence of those cues (as in Bodenhausen et al.'s experiments) might well reflect an analytic scrutiny of available relevant information. This argument suggests that their apparent reliance on cues might under certain circumstances actually reflect angry people's analytic processing, rather than their lack of it.

If engaging in analytic processing also entails scrutiny of cues, then our findings that angry people differentiate message content might well be reconciled with Bodenhausen et al.'s (1994) finding that angry people's judgments are affected by the presence of source cues. To test this idea, we once again induced neutral or angry emotional states before presenting a weak or strong persuasive appeal (the financial responsibility advocacy from Experiment 1). Following Bodenhausen et al., we also manipulated the availability of a cue about the source of the message. Some participants were given no source cue information. Others were told that the source of the message was the Agency for Financial Responsibility, source information relevant to the content of the advocacy. A third group was told that the source of the message was the equally impressive Agency for Medical Responsibility, a source whose expertise was not relevant to the content of the advocacy.

We made specific hypotheses about the impact of this manipulation on the judgments of angry processors.

First, we predicted that compared to their neutral counterparts, angry participants would process analytically and thus show an effect of message quality, when given no source cue information, replicating results from Experiments 1 and 2. Second, because we expected the analytic processing engaged in by angry participants to reveal the irrelevance of the source cue, we expected the same outcome when the cue provided was expert but irrelevant: Despite the presence of the irrelevant cue, angry participants would show an effect only of message quality, whereas neutral participants would not differentiate between messages of different content. That is, we expected identical results in the no-cue and the irrelevant-cue condition. Third, we hypothesized that angry participants would be influenced by source information when that information was relevant to the advocacy and would thus look much more like their neutral mood counterparts, who were not expected to differentiate between weak and strong messages. We thus predicted a three-way interaction among emotion, argument quality, and cue information. Despite empirical precedents for relying on differential effects of weak and strong arguments alone as evidence of analytic processing (see Briñol, Petty, & Wheeler, 2006), in this experiment we also assessed message elaboration as an additional direct indicator of such processing.

METHOD

Participants and Design

Participants were 274 undergraduates (75 men, 198 women, and 1 unreported) participating in exchange for course credit. They were randomly assigned to a 3 (cue: no, relevant, or irrelevant cue) \times 2 (emotion: neutral or angry) \times 2 (argument quality: weak or strong) factorial design.

Manipulation of Emotion

Emotion was manipulated using the guided-writing induction described in previous experiments. The neutral group reported yesterday's activities, whereas the angry group reported a personal experience during which they felt extremely angry.

Manipulation of Expertise

Participants were presented with source information for 30 s before reading the persuasive message. Participants in the no-cue condition received no source information about the essay and were simply told that the "following message was recently written." Participants in the relevant condition received an expert source whose

expertise was relevant to the message topic. Participants read “The following message was recently written by the Agency for Financial Responsibility. The Agency for Financial Responsibility is a group of U.S. government financial consultants.” Participants in the irrelevant condition received an expert source whose expertise was completely irrelevant to the message topic. Specifically, they read “The following message was recently written by the Agency for Medical Responsibility. The Agency for Medical Responsibility is a group of U.S. medical doctors.”⁵

Manipulation of Argument Quality

The weak and strong arguments were identical to those used in Experiment 1.

Dependent Measures

Attitude Index. The same three items used to assess attitude in Experiment 1 were again used here and averaged into an attitude index ($\alpha = .77$).

Thought listing. Immediately after reading the message, participants were asked to list any thoughts they had while reading the message (following Cacioppo & Petty, 1981). Participants were given unlimited time to list up to 10 thoughts. A coder blind to condition classified all thoughts into six categories: favorable, neutral, or unfavorable issue-relevant thoughts, or positive, neutral, or negative thoughts unrelated to the issue. An Elaboration Index was calculated by subtracting the number of unfavorable issue-relevant thoughts from the number of favorable issue-relevant thoughts (following Petty & Cacioppo, 1986). A second coder classified a subset of the thoughts to ensure satisfactory interrater reliability, $r = .83$.⁶

Effectiveness of the manipulation of emotion. Participants were asked to recall and report the emotions they felt immediately after writing their essay. Participants indicated the extent to which they felt each of 26 emotions using a scale from 1 (*not at all*) to 7 (*extremely*). To check the effectiveness of the manipulation of emotion, an Anger Index was created by averaging how angry, annoyed, frustrated, hostile, irritable, and mad participants reported feeling ($\alpha = .92$).⁷ Participants were then carefully debriefed and excused.

RESULTS AND DISCUSSION

Effectiveness of the Manipulation of Emotion

To verify the successful manipulation of emotion, the Anger Index was subjected to a 3 (cue) \times 2 (emotion) \times 2

(argument quality) between-subjects ANOVA. The expected main effect of emotion emerged, $F(1, 262) = 59.861$, $p < .001$. Neutral participants reported less anger ($M = 2.35$) than participants in the angry condition ($M = 3.74$).

Attitude Index

To examine how neutral and angry participants processed in each of the cue conditions, the Attitude Index was subjected to a 3 (cue) \times 2 (emotion) \times 2 (argument quality) between-subjects ANOVA. A main effect of argument quality emerged, $F(1, 262) = 12.22$, $p = .001$. Participants had less favorable attitudes after reading a weak message ($M = 4.11$) than after reading a strong message ($M = 4.56$). These effects were modified by significant cue by argument quality, $F(2, 262) = 3.71$, $p < .05$, and emotion by argument quality, $F(1, 262) = 11.60$, $p = .001$, interactions, which were in turn qualified by the theoretically relevant significant three-way interaction, $F(2, 262) = 4.38$, $p < .05$, among cue, emotion, and argument quality.

To fully understand the nature of this interaction, illustrated in Figure 3, we decomposed it into three 2-way interactions within each level of the cue factor. That is, to assess the fit of the data to our predictions, we compared how weak and strong messages were evaluated by neutral and angry participants for each type of cue separately.

As predicted, participants in the no-cue condition replicated the two-way interaction pattern found in Experiments 1 and 2, $F(1, 262) = 8.30$, $p < .05$. Neutral participants did not differentiate between the weak ($M = 4.37$) and strong ($M = 4.36$) messages, $F < 1$. In contrast, angry participants were less persuaded by the weak ($M = 3.57$) than the strong ($M = 4.80$) message, $F(1, 262) = 15.98$, $p < .001$, once again demonstrating that anger triggered analytic processing in the absence of heuristic cues.

Also as predicted, when participants received an irrelevant cue, the two-way interaction between emotional state and argument quality was significant, $F(1, 262) = 11.87$, $p < .001$. Neutral participants who received the irrelevant cue did not differentiate between weak ($M = 4.46$) and strong ($M = 4.45$) messages, $F < 1$. However, angry participants who received the irrelevant cue did successfully discriminate between weak ($M = 3.41$) and strong ($M = 4.93$) messages, $F(1, 262) = 22.13$, $p < .001$. In the presence of an irrelevant cue, neutral participants failed to discriminate between weak and strong messages, whereas angry participants were sensitive to differential argument quality. As predicted, then, the results from the no cue and irrelevant cue were identical, with neutral participants failing to process message content and angry participants doing so.

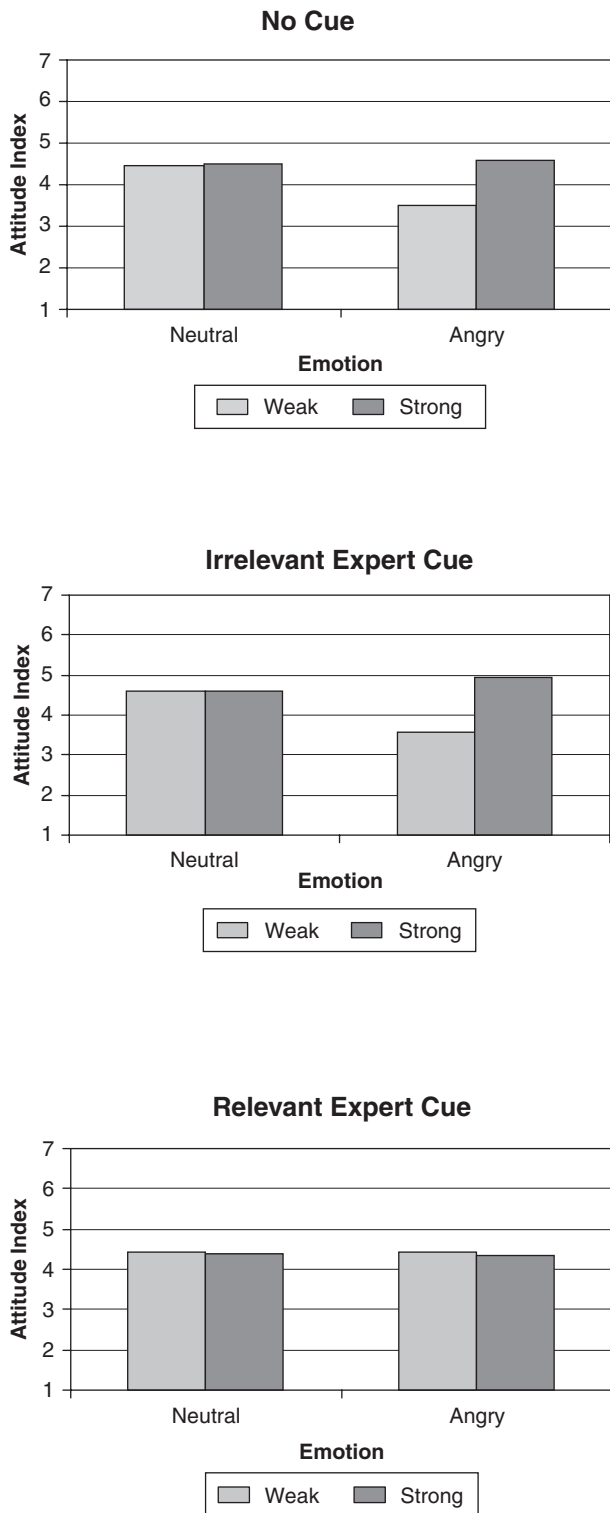


Figure 3 Mean Attitude Favorability as a Function of Emotion, Argument Quality, and Cue in Experiment 3.

In contrast, but again consistent with predictions, participants in the relevant-cue condition failed to differentiate between weak and strong arguments regardless of their emotional state, as indicated by the non-significant two-way interaction, $F < 1$. Neutral participants evaluated the weak and strong messages equally (weak $M = 4.32$, strong $M = 4.37$) as did angry participants (weak $M = 4.55$, strong $M = 4.42$), both $F_s < 1$. Only in the presence of a relevant cue did angry participants appear to be unaffected by message content.

To determine whether neutral and angry processors were differentially affected by the type of cue, we examined the cue by argument quality interaction for neutral and angry participants separately. Neutral participants always failed to differentiate between weak and strong arguments, regardless of the available source cue, as indicated by a nonsignificant two-way interaction, $F < 1$. In contrast, a significant two-way interaction for angry participants revealed selective reliance on cues, $F(2, 262) = 7.66, p < .01$. Further examination of this two-way interaction revealed that attitudes were not influenced by the available expertise cue, $F(2, 262) = 1.29, p > .25$, when strong arguments were presented. However, when weak arguments were presented, attitudes depended on which source cue was available, $F(2, 262) = 8.10, p < .001$. Simple main effects of angry participants' attitudes following weak arguments showed that attitudes were more favorable when a relevant expertise cue ($M = 4.55$) was presented than when either no cue ($M = 3.57$) $F(1, 262) = 10.23, p < .01$, or an irrelevant cue ($M = 3.41$) $F(1, 262) = 13.80, p < .001$, was presented (attitudes in these conditions did not differ). Thus, the presence of the relevant expert cue appeared to overcome the impact of a weak message but failed to further increase the already greater acceptance of the strong message.

Elaboration Index

The Elaboration Index was subjected to a 3 (cue) \times 2 (emotion) \times 2 (argument quality) between-subjects ANOVA. A main effect of argument quality revealed that more unfavorable thoughts were generated in response to the weak message ($M = -.95$) than the strong message ($M = -.21$), $F(1, 259) = 9.35, p < .01$. In addition, a significant emotion by argument quality interaction, $F(1, 259) = 5.42, p < .05$, was qualified by the three-way interaction of cue, emotion, and argument quality, $F(2, 259) = 5.05, p < .01$. Analysis of the simple main effects of strength within levels of the other factors revealed an identical pattern to that found for attitudes. Angry participants in the no-cue condition had more unfavorable thoughts after reading the weak

message ($M = -1.74$) than the strong message ($M = .57$), $F(1, 259) = 15.79, p < .001$. Similarly, angry participants who received the irrelevant cue responded with more unfavorable thoughts to the weak message ($M = -2.09$) than the strong message ($M = -.11$), $F(1, 259) = 10.57, p = .001$. The thoughts generated by participants in all other conditions failed to differentiate between weak and strong messages, $F_s < 1.13$. The pattern of cognitive responses to the weak and strong messages provide further evidence that angry people are willing and able to process analytically.

Mediational Analyses

To assess whether message elaboration explained the impact of argument quality on the attitudes reported by angry participants who received either no cue or an irrelevant cue (whom we claim to be analytically processing), we conducted a series of regression analyses within each of these two conditions (see Figure 4), following Baron and Kenny (1986). The argument quality factor was dummy coded (0 = weak, 1 = strong). For angry participants who did not receive a cue, the impact of argument quality on attitudes, $\beta = .55, p < .001$, and on thought favorability, $\beta = .51, p < .001$, was confirmed. When both were entered as predictors argument

quality, $\beta = .35, p < .05$, and the Thought Index, $\beta = .38, p < .01$, remained significant. However, the significant decrease in argument quality's predictive power (Sobel [1982] test, $Z = 2.30, p < .05$) provides evidence for partial mediation by thought favorability.

The same series of regressions was performed for angry participants who received an irrelevant cue. The effects of argument quality on attitudes, $\beta = .55, p < .001$, and on the Thought Index, $\beta = .47, p < .01$, were significant. When argument quality and the Thought Index were simultaneous predictors of attitude both argument quality, $\beta = .34, p < .05$, and the Thought Index, $\beta = .45, p < .01$, remained significant predictors. However, evidence for partial mediation by thought favorability was once again found, as indicated by the significant decrease in the predictive power of argument quality, $Z = 2.37, p < .05$.

In both these conditions, we expected and found evidence of analytic processing beyond differential reaction to strong and weak messages. Elaborations in these conditions appropriately reflected argument quality, indicating content-focused consideration of the message. Those elaborations in turn significantly influenced the attitudes formed. Taken together, the results of this study suggest that angry people can and will process analytically and show selective reliance on only relevant, appropriate cues. Given the inherent high quality of the strong message, it is likely that the relevant source cue had little power to further enhance attitudes. In contrast, only the relevant and appropriate cue enhanced attitudes in the weak-message condition, as predicted (the greater impact of manipulated variables on weak versus strong arguments is not atypical; see Claypool, Mackie, Garcia-Marques, McIntosh, & Udal, 2004).

The pattern of these differences does not provide definitive evidence as to how angry people used the cue. When the cue was used, it apparently affected weak arguments more than it did strong ones (the greater impact of many manipulated variables on weak rather than strong arguments is not atypical, however, see Claypool et al., 2004, and the results from Experiments 1 and 2). Whereas the more ambiguous weak arguments could be enhanced by the presence of a relevant and valid cue, perhaps the inherent high quality of the strong arguments prevented the source cue from further influence. A valid cue might have factored into a judgment as a single additional piece of information to be considered with all other information. Alternatively, the heuristic cue may have biased thoughts about the message, consistent with biased processing predictions outlined by both the heuristic-systematic model (Chaiken, 1987) and the elaboration-likelihood model (Petty & Cacioppo, 1986). Finally, it is possible that once the cue was carefully validated, judgment was based solely on the merits

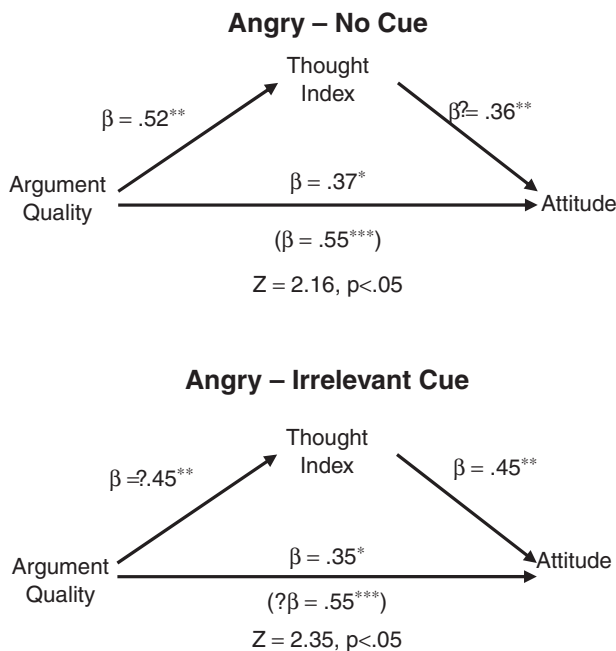


Figure 4 Mediation by Thought Favorability in Experiment 3

NOTE: Separate analyses for angry participants who received either no cue or an irrelevant cue. Argument quality coded as weak (0) and strong (1).

* $p < .05$, ** $p < .01$. *** $p < .001$.

of the cue. Some tentative evidence for the last explanation was found. Although mediational analyses were inappropriate for angry participants who received the expert cue, the correlation between the Thought Index and attitudes was nonsignificant, $p > .28$. However, the correlation between the Thought Index and attitudes was significant in the two other anger conditions (both $r_s > .56$). Thus, this suggests that angry people validated the cue and relied on it rather than their cognitive responses to the message when making their judgment. Future research should further explore this and other possibilities.

GENERAL DISCUSSION

All three experiments reported here showed consistent results. Unless a relevant cue was available, and regardless of whether neutral people discriminated weak and strong arguments, angry people were routinely sensitive to variations in argument quality, an effect reflected in both attitude change (Experiments 1-3) and message elaboration (Experiment 3) indices. This effect held regardless of how anger was elicited (Experiment 1) and regardless of the perceived positivity of the processed information (Experiments 1 and 3 vs. Experiment 2). The effect held even when a cue was available and accessible, as long as the cue was irrelevant (Experiment 3), a result that shows that angry people were also capable of distinguishing the validity of different cues. Experiment 2 established that anger can override dispositional tendencies to process nonanalytically and encourage more careful information processing. Thus, these experiments provide clear evidence that angry people have both the cognitive capacity and motivation to engage in analytic information processing.

Experiment 3 replicated past research (Bodenhausen et al., 1994) in that angry people were influenced by the presence of a source cue, but not just any cue. When presented an irrelevant but superficially expert source, angry processors ignored it, a feat that participants in neutral moods failed to accomplish. Our findings thus reconcile the idea that anger triggers analytic processing with the idea that angry processors sometimes rely on cues: Angry people appeared to process analytically by default and to selectively use only appropriate heuristic cues (whose validity they had apparently ascertained via careful processing). This pattern of means contradicts the notion that angry people use heuristics because they lack the cognitive resources or the motivation to engage in deeper processing.

Our findings are consistent with theoretical accounts of anger as a motivator of rather than a barrier to analytic thought. The mood as information model (Schwarz, 1990), which posits negative emotions as adaptive

triggers for processing geared to deal with environmental challenges, seems most compelling here. Anger, like other emotions, can be considered a functional emotion that motivates action in the face of actual or potential threat (Frijda, 1986). Although anger may under some circumstances ready the organism for swift, life-saving action, there is also value in accurately judging the source of the threat and the most efficient way to deal with it when the circumstances allow. Thus, an association between anger and analytic processing under certain circumstances may have adaptive benefits.

Perhaps one factor that determines when anger induces analytic thought is arousal. Especially intense instances of anger (such as rage or fury) are typically accompanied by high levels of arousal, and such arousal may well limit analytic processing. In these studies, however, we induced significantly greater *anger*, but neutral and angry participants did not differ in reported arousal. Thus, mild or moderate anger need not be accompanied by high levels of arousal and can thus perhaps be free of arousal's deleterious effects on processing. Experimental inductions that engender only moderate levels of anger thus allow for a focused analysis of anger without the complications associated with physiological arousal. Our findings suggest that anger without arousal can promote analytic processing. Further research is necessary to show whether anger accompanied by arousal disrupts analytic processing.

Our angry participants also failed to show the high certainty that others have claimed as a characteristic of anger (Smith & Ellsworth, 1985; Tiedens & Linton, 2001). Just as other emotions can be accompanied by varying levels of certainty (Tiedens & Linton, 2001; Experiment 4), so too, apparently, can anger. Our results suggest that people who are angry but not particularly certain process analytically. Future research should demonstrate whether anger accompanied by high certainty attenuates this effect and whether certainty plays an important causal role in anger's possible disruption of processing.

Perhaps because we induced moderate anger without either arousal or certainty, more local motivations than battling inhospitable environments might be at work here. The analytic processing demonstrated by our angry participants may have reflected the hedonic motivation to improve their negative mood, and consistent with the hedonic contingency model (Wegener & Petty, 1994), processing whatever material was available to them may have been a good way to do so. After all, angry participants analytically processed not just the positively toned information presented in Experiment 1 but also the negatively toned message of Experiment 2. Note, however, that in both experiments we collected mood measures

after information processing and neither of these processing endeavors appeared capable of completely lifting the angry participants' moods, as the theory might suggest (such continued anger is also inconsistent with misattribution of anger onto the arguments). However, as we were not able to compare how angry participants were at the time of the anger induction with how angry they were later, it is possible that the analytic processing they undertook did somewhat mollify them.

Our findings are a cautionary tale that cue usage need not be equated with the absence of analytic processing. It is also true that analytic processing engaged in by angry people need not be evenhanded and unbiased. For example, angry people perceive less risk (Fischhoff et al., 2005; Lerner & Keltner, 2001) and greater benefits of certain actions and events (DeSteno, Petty, et al., 2004; Lerner & Gonzalez, 2005) than people who are not angry. The particular attention they pay to the events or objects that caused their anger (Parrott et al., 2005) might be further psychological motivation to take action. At the same time, the attentional premium angry people place on anger-related information might be in the service of seeing that someone is punished, as anger appears to motivate the desire for retribution, revenge, and out-group bias (Averill, 1983; DeSteno, Dasgupta, et al., 2004). Future research could usefully assess whether and when such motivations bias anger-instigated analytic processing and resulting behaviors.

CONCLUSION

Three major points emerge from the current research. First, angry people can and do process analytically. Second, angry people can be influenced by heuristic cues even as they process analytically. Third, angry people do not rely on cues because they lack the cognitive capacity or motivation to process carefully. Instead, consistent with their analytic processing style, angry people selectively use only relevant cues.

Overall, this evidence refutes the inferences made from previous research that angry people's use of heuristics is always indicative of nonanalytic processing. Although nonanalytic processors rely on heuristic cues more, greater reliance on heuristic cues does not necessarily indicate nonanalytic processing. Motivational theories and functional perspectives about emotion provide alternative reasons for why some discrete emotions may encourage cue usage.

Anger-induced action is often seen as particularly deleterious, because anger has "blown out the light of reason." Our research suggests that anger-induced action might well be the result of quite clear-minded and deliberative processing. Which is more dangerous?

APPENDIX

WEAK FINANCIAL HABITS MESSAGE

The notion that college students have poor spending habits that get them into financial trouble is a common misconception. There really doesn't seem to be a very strong relationship between financial habits and age in today's society. Intelligence is a strong indicator of financial responsibility, and since college students are mostly intelligent, depending on the school, they should handle their finances well.

In reality, college students do not have many necessary reasons to spend their money so it's more difficult for them to accumulate a large debt. Some people believe that poor spending habits seem to get worse when more financial burdens arise, a situation that college students usually don't have. Simply by asking around, a person can tell that people with financial problems tend to be a little older than college students.

A few extra college students are investing these days compared to students that were in college 10 years ago. Small banks like to recruit college students on campuses to open new savings accounts because some of these students will keep a small amount of money in their account. Specifically, college students attending universities in New York might have a savings account open even though most of these accounts have a zero balance. A few investment banks reported that a small portion of their customers are college students who usually have about 90 dollars invested by their senior year.

STRONG FINANCIAL HABITS MESSAGE

There is now sufficient research to disprove the idea that college students have poor spending habits that get them into trouble. Studies performed at Princeton University have shown that spending habits are completely unrelated to age, therefore youth does not predict financial responsibility. Level of education is a strong indicator of financial responsibility, and since college students are among the most educated of people they manage their finances well.

Because college students do not tend to have enormous necessary expenses, they tend to avoid large amounts of debt. According to a government survey, poor spending habits are usually most pronounced when additional responsibilities develop, such as owning a home or having children. The survey also revealed that most people with financial problems are approximately 35 years old, which is older than the average college student.

Many more college students are investing these days compared to students that were in college 10 years ago. Small banks love to recruit college students on campuses to open new savings accounts because most of these students will keep a large amount of money in their account. Specifically, college students attending universities in New York are very likely to have a savings account open in which they regularly make large deposits. Several well-respected investment banks reported that a large portion of their customers are college students who usually have about 3,000 dollars invested by their senior year.

NOTES

1. Twenty participants using a scale anchored by 1 (*strongly disagree*) and 7 (*strongly agree*) reported a mean attitude ($M = 4.71$) significantly above the scale midpoint, $t(30) = 2.83$, $p < .01$, indicating that college students were seen as financially irresponsible and that the message used here was counterattitudinal. Twenty different participants reported how valid they thought the weak or strong messages were on a scale from 1 (*very invalid*) to 7 (*very valid*). A t test confirmed the differential strength of the weak ($M = 3.4$) and strong ($M = 4.9$) messages, $t(18) = -2.83$, $p < .05$.

2. An Arousal Index was created for each study by averaging participants' reports of how active, alert, and attentive they were feeling (all α s $> .76$). Participants in the neutral and angry conditions never significantly differed in levels of arousal in any of the studies.

3. Due to a clerical error, two different scales were used to collect emotion reports. Standardized scores were used in all analyses on emotion variables to correct for unequal scales. Raw means for the 5-point scale (Neutral $M = 1.62$, Angry $M = 2.22$) and the 7-point scale (Neutral $M = 1.77$, Angry $M = 2.26$) also reflected the desired effect of the manipulation.

4. The anticipated unpleasantness of reading the comprehensive exam messages was verified by 31 participants who reported how enjoyable (1 = *unenjoyable*, 7 = *enjoyable*), happy (1 = *unhappy*, 7 = *happy*), and pleasant (1 = *unpleasant*, 7 = *pleasant*) it would be to read a message arguing for the implementation of comprehensive exams. The average of all three items ($M = 2.66$, $\alpha = .88$) fell significantly below the scale midpoint of 4, which was labeled "neutral" on all scales, $t(29) = -6.10$, $p < .001$.

5. Thirty-one pilot participants reported that the Agency for Financial Responsibility and the Agency for Medical Responsibility were equally expert and qualified (financial $M = 4.59$, medical $M = 4.97$), $F < 1$. In contrast, they reported that the financial agency's opinion was more relevant and appropriate ($M = 4.66$) for a message on college students' financial habits than the medical agency's opinion, $F(1, 29) = 5.40$, $p < .05$.

6. Identical patterns emerged from a Thought Index calculated by subtracting unfavorable from favorable issue-relevant thoughts and dividing by the number of thoughts generated. Thoughts related to the source were coded but were too few to perform meaningful analyses.

7. Before completing demographics, neutral and angry participants completed certainty-appraisal measures about the events reported in the emotion-induction essay. Following Tiedens and Linton (2001), participants used a 7-point scale (1 = *not at all*, 7 = *very much*) to report how well they understood what was happening in the situation, how uncertain they were about what would happen, and how well they could predict what was going to happen next. Analyses revealed angry participants were more uncertain ($M = 3.24$) about what would happen than neutral participants, ($M = 2.71$), $F(1, 262) = 7.81$, $p < .01$. Angry participants also believed themselves less able to predict what would happen than neutral participants ($M = 3.59$), $F(1, 262) = 3.75$, $p = .05$. There were no differences in how well

neutral and angry participants understood what was happening in the situation. Overall, these results indicate that our participants, though clearly angry, were not highly certain.

REFERENCES

- Albarracín, D., & Kumkale, G. T. (2003). Affect as information in persuasion: A model of affect identification and discounting. *Journal of Personality and Social Psychology*, 29, 834-845.
- Albarracín, D., & Wyer, R. S. (2001). Elaborative and nonelaborative processing of a behavior-related communication. *Personality and Social Psychology Bulletin*, 27, 691-705.
- Averill, J. R. (1983). Studies on anger and aggression: Implications for theories of emotion. *American Psychologist*, 38, 1145-1160.
- Bargh, J. A. (1994). The four horsemen of automaticity: Awareness, intention, efficiency, and control in social cognition. In R. S. Wyer, Jr. & T. K. Srull (Eds.), *Handbook of social cognition* (2nd ed., pp. 1-40). New York: Guilford.
- Baron, R. A. (1977). *Human aggression*. New York: Plenum.
- Baron, R. M., & Kenny, D. A. (1986). The moderator-mediator variable distinction in social psychological research: Conceptual, strategic, and statistical considerations. *Journal of Personality and Social Psychology*, 51, 1173-1182.
- Berkowitz, L. (1993). *Aggression: Its causes, consequences, and control*. New York: McGraw-Hill.
- Bless, H., Bohner, G., Schwarz, N., & Strack, F. (1990). Mood and persuasion: A cognitive response analysis. *Personality and Social Psychology Bulletin*, 16, 331-345.
- Bodenhausen, G. V., Sheppard, L. A., & Kramer, G. P. (1994). Negative affect and social judgment: The differential impact of anger and sadness. *European Journal of Social Psychology*, 24, 45-62.
- Briñol, P., Petty, R. E., & Wheeler, S. C. (2006). Discrepancies between explicit and implicit self-concepts: Consequences for information processing. *Journal of Personality and Social Psychology*, 91, 154-170.
- Cacioppo, J. T., & Petty, R. E. (1981). Social psychological procedures for cognitive response assessment: The thought listing technique. In T. Merluzzi, C. Glass, & M. Genest (Eds.), *Cognitive assessment* (pp. 309-342). New York: Guilford.
- Cacioppo, J. T., & Petty, R. E. (1982). The need for cognition. *Journal of Personality and Social Psychology*, 42, 116-131.
- Cacioppo, J. T., & Petty, R. E. (1989). Effects of message repetition on argument processing, recall, and persuasion. *Basic and Applied Social Psychology*, 10, 3-12.
- Chaiken, S. (1987). The heuristic model of persuasion. In M. P. Zanna, J. M. Olson, & C. P. Herman (Eds.), *Social influence: The Ontario symposium* (Vol. 5, pp. 3-39). Hillsdale, NJ: Lawrence Erlbaum.
- Chaiken, S., Liberman, A., & Eagly, A. H. (1989). Heuristic and systematic information processing within and beyond the persuasion context. In J. S. Uleman & J. A. Bargh (Eds.), *Unintended thought* (pp. 212-252). New York: Guilford.
- Chen, S., & Chaiken, S. (1999). The heuristic-systematic model in its broader context. In S. Chaiken & Y. Trope (Eds.), *Dual-process theories in social psychology* (pp. 73-96). New York: Guilford.
- Claypool, H. M., Mackie, D. M., Garcia-Marques, T., McIntosh, A., & Udal, A. (2004). The effects of personal relevance and repetition on persuasive processing. *Social Cognition*, 22, 310-355.
- DeSteno, D., Dasgupta, N., Bartlett, M. Y., & Caidric, A. (2004). Prejudice from thin air: The effect of emotion on automatic intergroup attitudes. *Psychological Science*, 15, 319-324.
- DeSteno, D., Petty, R. E., Rucker, D. D., Wegener, D. T., & Braverman, J. (2004). Discrete emotions and persuasion: The role of emotion-induced expectancies. *Journal of Personality and Social Psychology*, 86, 43-56.
- Dunn, J. R., Schweitzer, M. E. (2005). Feeling and believing: The influence of emotion on trust. *Journal of Personality and Social Psychology*, 88, 736-748.
- Eagly, A. H., & Chaiken, S. (1993). *The psychology of attitudes*. Orlando, FL: Harcourt Brace Jovanovich College.

- Fischhoff, B., Gonzalez, R. M., Lerner, J. S., & Small, D. A. (2005). Evolving judgments of terror risks: Foresight, hindsight, and emotion. *Journal of Experimental Social Psychology, 11*, 124-139.
- Fiske, S. T., & Taylor, S. E. (1991). *Social cognition* (2nd ed.). New York: McGraw-Hill.
- Forgas, J. P. (1995). Mood and judgment: The affect infusion model (AIM). *Psychology Bulletin, 117*, 39-66.
- Frijda, N. H. (1986). *The emotions*. Cambridge, UK: Cambridge University Press.
- Geen, R. G. (1995). Human aggression. In A. Tesser (Ed.), *Advanced social psychology* (pp. 383-418). New York: McGraw-Hill.
- Henry, J. P. (1986). Neuroendocrine patterns of emotional response. In R. Plutchick & H. Kellerman (Eds.), *Emotion: Theory, research, and experience* (Vol. 3, pp. 37-60). Orlando, FL: Academic Press.
- Kruglanski, A. W., & Thompson, E. P. (1999). Persuasion by a single route: A view from the unimodel. *Psychological Inquiry, 10*, 83-109.
- Lambert, A. J., Khan, S. R., Lickel, B. A., & Fricke, K. (1997). Mood and the correction of positive versus negative stereotypes. *Journal of Personality and Social Psychology, 72*, 1002-1016.
- Lazarus, R. S. (1981). The stress and the coping paradigm. In C. Eisdorfer, D. Cohen, A. Kleinman, & P. Maxim (Eds.), *Models for clinical psychopathology* (pp. 177-183, 192-201). Jamaica, NY: Spectrum.
- Lerner, J. S., Goldberg, J. H., & Tetlock, P. E. (1998). Sober second thought: The effects of accountability, anger, and authoritarianism on attributions of responsibility. *Personality and Social Psychology Bulletin, 6*, 563-574.
- Lerner, J. S., & Gonzalez, R. M. (2005). Forecasting one's future based on fleeting subjective experiences. *Personality and Social Psychology Bulletin, 31*, 454-466.
- Lerner, J. S., & Keltner, D. (2001). Fear, anger, and risk. *Journal of Personality and Social Psychology, 81*, 146-159.
- Mandler, G. (1975). *Mind and emotion*. New York: John Wiley.
- McCoy, S. K. (2004). A double edged sword: Ideology and self-esteem among low status groups (Doctoral dissertation, University of California, Santa Barbara, 2004). *Dissertation Abstracts International, 64*, 4112.
- McCoy, S. K., & Major, B. (2003). Group identification moderates emotional responses to perceived prejudice. *Personality and Social Psychology Bulletin, 29*, 1005-1017.
- Parrott, D. J., Zeichner, A., & Evces, M. (2005). Effect of trait anger on cognitive processing of emotional stimuli. *Journal of General Psychology, 132*, 67-80.
- Petty, R. E., & Cacioppo, J. T. (1986). *Communication and persuasion: Central and peripheral routes to attitude change*. New York: Springer-Verlag.
- Petty, R. E., Cacioppo, J. T., & Goldman, R. (1981). Personal involvement as a determinant of argument-based persuasion. *Journal of Personality and Social Psychology, 41*, 847-855.
- Petty, R. E., & Wegener, D. T. (1998). Attitude change: Multiple roles for persuasion variables. In D. T. Gilbert, S. T. Fiske, & G. Lindzey (Eds.), *The handbook of social psychology* (Vol. 1, pp. 323-390). New York: McGraw-Hill.
- Ric, F. (2004). Effects of the activation of affective information on stereotyping: When sadness increases stereotype use. *Personality and Social Psychology Bulletin, 30*, 1310-1321.
- Roseman, I. J. (1984). Cognitive determinants of emotion: A structural theory. *Review of Personality and Social Psychology, 5*, 11-36.
- Russell, J. A. (2003). Core affect and the psychological construction of emotion. *Psychological Review, 110*, 145-172.
- Schachter, S. (1964). The interaction of cognitive and physiological determinants of emotional state. In L. Berkowitz (Ed.), *Advances in experimental social psychology* (pp. 49-79). New York: Academic Press.
- Scherer, K. R. (1982). Emotion as a process: Function, origin, and regulation. *Social Science Information, 21*, 555-570.
- Schwarz, N. (1990). Feeling as information: Informational and motivational functions of affective states. In E. T. Higgins & R. M. Sorrentino (Eds.), *Handbook of motivation and cognition* (Vol. 2., pp. 527-561). New York: Guilford.
- Slovan, S. A. (1996). The empirical case for two systems of reasoning. *Psychological Bulletin, 119*, 3-22.
- Smith, C. A. (1989). Dimensions of appraisal and physiological response in emotion. *Journal of Personality and Social Psychology, 56*, 339-353.
- Smith, E. R., & DeCoster, J. (2000). Dual-process models in social and cognitive psychology: Conceptual integration and links to underlying memory systems. *Personality and Social Psychology Review, 4*, 108-131.
- Smith, C. A., & Ellsworth, P. C. (1985). Patterns of cognitive appraisal in emotion. *Journal of Personality and Social Psychology, 48*, 813-838.
- Smith, C. A., & Lazarus, R. S. (1993). Appraisal components, core relational themes, and the emotions. *Cognition and Emotion, 7*, 233-269.
- Sobel, M. E. (1982). Asymptotic intervals for indirect effects in structural equations models. In S. Leinhardt (Ed.), *Sociological methodology 1982* (pp. 290-312). San Francisco: Jossey-Bass.
- Strack, F., Schwarz, N., & Gschneidinger, E. (1985). Happiness and reminiscing: The role of time perspective, affect, and mode of thinking. *Journal of Personality and Social Psychology, 49*, 1460-1469.
- Tiedens, L. Z., & Linton, S. (2001). Judgment under emotional certainty and uncertainty: The effects of specific emotions in information processing. *Journal of Personality and Social Psychology, 81*, 973-988.
- Walley, R. E., & Weiden, T. D. (1973). Lateral inhibition and cognitive masking: A neuropsychological theory of attention. *Psychological Review, 4*, 284-302.
- Wegener, D. T., & Petty, R. E. (1994). Mood management across affective states: The hedonic contingency hypothesis. *Journal of Personality and Social Psychology, 66*, 1034-1048.
- Wegener, D. T., Petty, R. E., & Smith, S. M. (1995). Positive mood can increase or decrease message scrutiny: The hedonic contingency view of mood and message processing. *Journal of Personality and Social Psychology, 69*, 5-15.

Received April 4, 2006

Revision accepted October 27, 2006