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*Pers Soc Psychol Bull* 1996; 22; 547

DOI: 10.1177/0146167296226001

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# Working Knowledge, Cognitive Processing, and Attitudes: On the Determinants of Bias

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*This experiment demonstrated that attitude-relevant knowledge can enable biased or objective systematic processing of new information. Subjects having a high or low knowledge on AIDS risk prevention evaluated a series of scenarios estimating the likelihood of contracting AIDS from sexual behavior. Knowledgeable subjects who reported considerable fear of AIDS engaged in biased processing of the risk estimates. The intense affect apparently motivated these subjects to use their knowledge to bolster and defend their existing attitudes toward AIDS risk: They gave more favorable evaluations of risk estimates that supported their attitudes than estimates that opposed them. In contrast, knowledgeable subjects who reported only moderate AIDS fear did not appear motivated to assume a defensive stance and instead processed the AIDS risk estimates in a critical, objective manner regardless of the congruence with their own attitudes. Less knowledgeable subjects did not demonstrate either a biased or an objectively critical processing orientation.*

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**T**hrough the media, personal experience, and observation of others' experiences, daily life provides a wealth of new information on attitude issues. When people are already knowledgeable about a topic, they have extensive attitude-relevant beliefs and prior experiences available in memory to evaluate new information and to inform their attitude judgments. Indeed, research has shown that knowledgeable people are better able to evaluate the validity of persuasive messages than less knowledgeable ones; furthermore, knowledgeable people have more stable attitudes that are resistant to change (Kruglanski, Webster, & Klem, 1993; Wood, 1982; Wood & Kallgren, 1988; Wood, Kallgren, & Preisler, 1985; Wood, Rhodes, & Biek, 1995).

Researchers have proposed at least two ways in which the information underlying attitudes could be used in

evaluations of new information: It could form the basis for biased, defensive evaluations (e.g., Petty & Cacioppo, 1986; Petty, Priester, & Wegener, 1994) or critical, objective evaluations (e.g., Wood & Kallgren, 1988; Wood et al., 1985). When defensively motivated, a knowledgeable person functions much like a biased Olympic judge who uses her expertise to identify strengths in performances of athletes from her home country and weaknesses in others' performances, allowing a decision favorable to home athletes. When objectively motivated, a knowledgeable person is a critical evaluator of all relevant information, much like a tough Olympic judge who critically evaluates all performances and renders impartial but exacting decisions consistent with the rules of the sport. The present research develops and tests a model of the conditions under which knowledge contributes to each of these processing orientations.

## KNOWLEDGE AND BIASED PROCESSING

Biased, or directional, processing of new information is designed to support a particular attitude position. Bias is thus reflected in more favorable evaluation of

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**Authors' Note:** This study was conducted by Michael Biek in partial fulfillment of the requirements for the doctoral degree at Texas A&M University. The research was partially supported by a dissertation fellowship from the Texas A&M University College of Liberal Arts to Michael Biek and by National Institute of Mental Health grants to Wendy Wood (No. MH49895) and to Shelly Chaiken (No. MH43299). The authors thank Blair Johnson for his helpful comments on an earlier draft. Michael Biek is now at FTI Corp. Correspondence concerning this article should be addressed to Wendy Wood, Department of Psychology, Texas A&M University, College Station, TX 77843.

*PSPB*, Vol. 22 No. 6, June 1996 547-556

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information that supports a particular attitude judgment than information that refutes it. Knowledgeable people are likely to be especially proficient biased processors because they can draw on an extensive information base in service of this goal. They have the cognitive resources to detect weaknesses in attitude-challenging information and to bolster and support congenial information. Thus knowledgeable people may be especially proficient defense-motivated systematic processors (Chaiken, Giner-Sorolla, & Chen, 1996; Chaiken, Liberman, & Eagly, 1989). This link between knowledge and biased processing has been articulated in some theoretical accounts of persuasion (e.g., Petty & Cacioppo, 1986). In this view, because most attitude-relevant knowledge supports rather than refutes people's attitudes (see Wood et al., 1995), reliance on this biased database will likely generate more positive evaluations of attitude-congenial than attitude-opposing persuasive messages.

Suggestive empirical support for the idea that knowledge can be used in biased, attitude-defensive processing is provided by research on the *hostile media phenomenon* (Giner-Sorolla & Chaiken, 1994; Vallone, Ross, & Lepper, 1985). Vallone et al. (1985) had members of pro-Arab and pro-Israeli student organizations judge the fairness and objectivity of various televised news reports of conflict in Lebanon. Each side judged that the news segments were biased in favor of the other side. In addition, within both groups, this hostile media bias effect was most apparent among those subjects who identified themselves as particularly knowledgeable or as highly emotionally involved.

It is also possible that knowledge has contributed to other demonstrations of attitude-defensive bias. For example, Lord, Ross, and Lepper (1979) examined how people who were strong proponents or opponents of capital punishment evaluated relevant research (see also Houston & Fazio, 1989; Miller, McHoskey, Bane, & Dowd, 1993; Pomerantz, Chaiken, & Tordesillas, 1995). In general, subjects' evaluations of research findings bolstered and defended their initial attitudes; proponents were more impressed with studies suggesting that capital punishment was effective (vs. ineffective) and opponents were more impressed with studies suggesting that it was ineffective (vs. effective). For our purposes, it is interesting to note that the subjects in this study were selected not only for their extreme initial attitudes on capital punishment but also for their initial judgments that existing research supported their view. It is plausible that subjects who could not assess the relevant literature were selected out of this study and only the ones who believed they could evaluate the facts were retained. Thus Lord and associates' (1979) findings of biased processing may have emerged from a selection of sub-

jects who believed themselves to be especially knowledgeable about the attitude topic.<sup>1</sup>

#### KNOWLEDGE AND OBJECTIVE PROCESSING

Attitude-relevant knowledge can also be used to evaluate new information in an informed, impartial manner. When processing objectively, knowledgeable people use their considerable information base to critically evaluate all information, whether supportive of or opposed to their position. Thus the resistance to persuasion that arises with knowledge stems from knowledgeable people's ability to detect weaknesses in all but the most cogent arguments (Johnson, Lin, Symons, Campbell, & Ekstein, 1995; Wood, 1982; Wood et al., 1985).

An early study by Lewan and Stotland (1961) provided empirical support for the objective criticality view. They experimentally varied knowledge by providing subjects with nonevaluative, factual information about a country, "Andorra," or information about another country, "Etruria," before presenting them with an emotionally toned appeal that attacked Andorra. Among high-knowledge subjects (i.e., those who had received information about Andorra), initial attitudes ranged from pro- to anti-Andorra. Consistent with the idea that knowledge is associated with objective criticality, knowledgeable subjects proved resistant to the emotional, anti-Andorra message regardless of whether it was congenial to their initial views (anti-Andorra subjects) or opposed to these views (pro-Andorra subjects).

Additional evidence that knowledgeability is associated with objective processing is provided by a series of studies on *working knowledge* (Wood, 1982; Wood & Kallgren, 1988; Wood et al., 1985; Wood et al., 1995). Working knowledge represents the attitude-relevant beliefs and prior experiences people can readily bring to mind when confronted with an attitude issue. People with high levels of working knowledge have been found to critically evaluate new information in terms of their beliefs and prior experiences. This information base is used to identify strengths and detect weaknesses in persuasive messages, so that knowledgeable people respond more favorably to messages with cogent, convincing arguments than to messages with weak, spurious ones (Johnson et al., 1995; Wood et al., 1985). In this view, the fact that attitude-relevant knowledge tends to support favored attitude positions (Wood et al., 1995) does not necessarily compromise knowledgeable people's ability to recognize strengths in opposing arguments or weaknesses in congenial ones.

Two recent experiments were specifically designed to test the extent to which working knowledge confers objective criticality versus biased processing (Wood, Biek, Nations, & Chaiken, 1994). Subjects who were

favorable toward environmental preservation read a persuasive message that argued against preservation (i.e., a counterattitudinal position) or one that supported preservation but advocated a position either slightly more extreme or slightly less extreme than subjects' own (i.e., proattitudinal positions). Knowledgeability proved to be associated with general resistance to new information: In comparison with no-message control subjects, knowledgeable recipients proved resistant to both the counterattitudinal and the proattitudinal messages. In contrast, low-knowledge subjects, compared with no-message controls, demonstrated marked attitude change to proattitudinal messages and some change to counterattitudinal ones. Furthermore, analysis of subjects' cognitive responses indicated that, overall, knowledgeable subjects generated more negative evaluations of the messages than low-knowledge subjects. In addition, low-knowledge subjects generated a stronger pattern of more favorable responses to proattitudinal than counterattitudinal messages than high-knowledge subjects. Thus, in these two studies, the resistance associated with knowledgeability did not reflect biased processing designed to maintain initial attitudes.

#### PREDICTING MOTIVATED AND OBJECTIVE USE OF KNOWLEDGE

Although there are convincing theoretical and empirical reasons to accept the conclusion that attitude-relevant knowledge can operate in defensively as well as objectively motivated processing, we know little about the conditions under which each processing orientation might obtain. A suggestive hint of the conditions necessary for biased use of knowledge may be found in the research by Vallone et al. (1985) on the hostile media phenomenon. Despite their success at documenting biased processing of media reports among partisan groups in the Middle East crisis, they were apparently unable to demonstrate this effect in a preliminary investigation that compared supporters of Carter versus Reagan in the 1980 U.S. presidential election. Vallone et al. (1985) attributed this failure to the low level of affect generated by the presidential race: Apparently, few of their subjects possessed strong feelings, and for most the campaign and elections were "dead issues." In addition, Kunda (1987, 1990) has suggested that motivated processing emerges when messages contain personally threatening information (e.g., for female caffeine consumers, a message on the health risks of caffeine for women). Kunda suggests that simply being knowledgeable about an issue may not be sufficient to motivate defensive processing (e.g., this message for male caffeine consumers).

It may be, then, that biased processing is stimulated by the intense affective reactions associated with involving,

personally relevant issues. Affect-laden issues may motivate knowledgeable people to use their extensive store of information in a closed-minded manner, bolstering and protecting existing views. Although a number of constructs have been proposed to capture the extent to which attitudes reflect "hot," motivated judgments (e.g., importance, involvement, vested interest, attitude extremity), it is unclear which of these qualities will motivate biased use of attitude-relevant knowledge (indeed, these various qualities appear to represent unique constructs and may generate diverse effects; Krosnick, Boninger, Chuang, Berent, & Carnot, 1993; Petty & Krosnick, 1995; Pomerantz et al., 1995). Accordingly, in the present experiment, we decided to assess directly the extent to which an issue generates hot emotional, affective reactions.

#### THE PRESENT EXPERIMENT

The present study used an attitude topic, personal AIDS risk, on which our college student subjects varied in affective intensity. Some students experienced intense affect on this topic and viewed it as personally threatening, whereas others experienced only the minimal affect associated with slight perceived threat. This topic also provided an ideal forum for the present experiment because our subjects exhibited a range of attitude-relevant knowledge concerning AIDS risk and because knowledgeability and affective intensity were uncorrelated, allowing us to examine these two constructs independently (in our sample, the correlation between measures proved to be  $r = .09$ ,  $ns$ ).

Subjects were presented with a series of scenarios, each of which described a high or low likelihood of contracting HIV from a sexual activity (a design adapted from Lord et al., 1979). We expected that subjects who experienced high affect concerning AIDS risk and possessed extensive attitude-relevant knowledge would be both motivated and able to defend their attitudes toward AIDS prevention through a biased analysis of the scenario information. They were expected to generate more favorable evaluations (assessed through subjects' thoughts) of scenario risk estimates congenial to their attitudes than ones countering their attitudes. That is, subjects with positive attitudes toward AIDS prevention should give more favorable evaluations to scenarios suggesting a high risk of contracting AIDS than low risk scenarios, whereas those with less positive attitudes toward AIDS prevention should more favorably evaluate low-risk than high-risk scenarios. Furthermore, these differential evaluations may be reflected in subjects' attitude ratings, and subjects may agree more with the attitude-congenial (vs. attitude-challenging) scenarios. In contrast, knowledgeable subjects who do not

experience strong affect are unlikely to be defensively motivated. These high-knowledge, low-affect subjects should use their extensive understanding of the issue to systematically process all new information, and they should not preferentially evaluate congenial scenarios. Furthermore, this pattern of evaluation should yield comparable attitudes toward congenial and challenging scenarios.

We did not have any clear predictions for our subjects with minimal knowledge. Their limited understanding of AIDS risk should give them little basis on which to evaluate the plausibility of the various risk estimates. Thus they should have difficulty engaging in any systematic evaluation of the scenarios, and their thoughts are unlikely to yield a clear pattern of biased or objective processing.

## METHOD

### *Subjects*

Participants were 172 introductory psychology students at Texas A&M University, 63 men and 109 women. Seventeen subjects who failed to participate in Session 2 were not included in this sample.

### *Procedure: Session 1*

Group sessions were conducted with approximately 25 subjects. Unmarked packets of experimental materials were distributed around a large lecture room so that subjects could complete the questionnaires in privacy. The questionnaires contained the working knowledge, attitude, and affect measures (see below). To further ensure anonymity, subjects were told to deposit their completed materials in a box at the front of the room and were told not to mark any personally identifying information on the packets except the last four digits of their Social Security numbers and the last four digits of their phone numbers.

*Working knowledge: Recall of relevant beliefs and behaviors.* Using the format designed by Wood (1982) to measure working knowledge, subjects listed the facts and then the behaviors relevant to their personal likelihood or risk for contracting HIV. Subjects listed a mean of 3.37 facts and 1.94 behaviors. These components of working knowledge proved to be moderately correlated ( $r = .48$ ). The scores were standardized to allow summation across the belief and behavior components; subjects were categorized as high or low in knowledge by a median split on the composite measure.

*Affect.* Subjects' negative affect concerning AIDS risk was assessed using a modified adjective checklist procedure. Subjects indicated the extent to which the risk for getting AIDS made them feel angry, tense, defiant,

fearful, rebellious, nervous, worried, disgusted, and hostile on scales ranging from 1, *not at all*, to 7, *very much so*. Ratings on each scale were converted to standardized scores to facilitate comparison across scales. Principal components factor analysis (varimax rotation) on the nine affect scales yielded a single factor that accounted for 52% of the variance in subjects' responses. Item analysis on the affect scales further revealed a coefficient alpha of .88. The standardized scale scores were therefore summed to form a composite measure of affective intensity. Subjects were categorized as high or low in affect by a median split of the standardized scores. Mean ratings, in raw scale units, were 2.71 for the low-affect group and 4.91 for the high-affect group.

*Attitudes.* Subjects' attitudes were assessed with respect to three aspects of AIDS prevention: condom use, abstinence, and monogamy. For the issue condom use, subjects rated, on 15-point scales anchored by *strongly disagree* and *strongly agree*, their agreement with the statements "Using condoms to lower my risk for getting AIDS is a good thing to do" and "I would rather take my chances on getting AIDS than always use condoms." Attitudes were then assessed on two similar items concerning abstinence and two items concerning monogamy as methods of personal AIDS-risk reduction. Scale ratings were converted so that higher numbers always indicated greater favorability toward AIDS prevention.

Attitudes toward condom use, abstinence, and monogamy as AIDS preventives were also assessed on six 7-point semantic differential scales anchored by *bad-good*, *unpleasant-pleasant*, *uncomfortable-comfortable*, *foolish-wise*, *unrealistic-realistic*, and *not worth it-worth it*. The semantic differential scales were converted to 15-point scales and combined with the favorability ratings to form a measure of overall favorability toward reducing personal AIDS risk (mean  $r$  across measures = .67). Initial attitudes toward AIDS-preventive behaviors did not correlate with working knowledge,  $r = -.13$ , *ns*, or with affect,  $r = -.03$ , *ns*.

### *Procedure: Session 2*

Approximately 3 weeks after the first session, subjects returned to the lab and indicated their reactions to a series of AIDS risk projections presented in four separate behavioral scenarios. Each scenario described a sexual encounter along with two different estimates of the likelihood of acquiring the HIV virus in this interaction (see below). The two estimates were attributed to independent researchers supposedly affiliated with respected universities and were supposedly based on research reported in a recent issue of *The New England Journal of Medicine*.

After reading each scenario, subjects rated their agreement with the first AIDS risk estimate and listed

their thoughts about it. They then completed these measures for the second risk estimate for the scenario (see below). The order in which subjects received the high- and low-risk estimates for each scenario was randomized so that, for each scenario, approximately half the subjects responded to the high-risk estimator first and half to the low-risk estimator.

After reading and responding to the two risk estimates for each of the four scenarios, subjects completed a variety of individual difference measures (see below). Subjects were then debriefed as to the fictitious nature of the AIDS risk estimates and were provided with accurate information about the incidence and communicability of AIDS and the effectiveness of AIDS-preventive measures.

#### *AIDS Risk Scenarios*

Four behavioral scenarios were presented, each followed by a high- and a low-risk estimate of contracting the HIV virus in the scenario (presented in randomized order across subjects). The first scenario described unprotected heterosexual sex with an individual known to be infected with the HIV virus. The given odds of acquiring the virus were claimed by Researcher A to be "one chance in 1,000" and by Researcher B to be "one chance in two." The second scenario also described heterosexual sex with someone who had AIDS but stipulated the use of a condom. The low-risk estimate was 1 chance in 10,000 of acquiring the virus, whereas the high estimate was 1 chance in 50. The third scenario described unprotected heterosexual intercourse with a partner who was not a member of any known risk group. The low-risk estimate was 1 chance in 5 million, and the high estimate was 1 in 200. The final scenario involved protected sex with a nonrisk partner. The low-risk estimate was given as 1 in 50 million, whereas the high estimate was 1 in 500.

#### *Dependent Measures*

*Evaluative thoughts about scenario risks.* For the high-risk estimates, subjects were given 2½ min to list the thoughts they had while they were reading the estimates of risk. They were then given a comparable amount of time to indicate thoughts about the low-risk estimates. Valence of thoughts (positive vs. negative vs. neutral) as well as content (reactions to message content vs. new subject-generated information vs. irrelevant) were coded by two raters; interrater agreement for both schemes was 96%. Differences in ratings were resolved through discussion. The proportion of each type of thought out of the total number of thoughts listed was calculated separately for the high-risk estimates and for the low-risk estimates, aggregated across the four scenarios.

*Agreement.* Subjects rated their agreement with each of the researchers' estimates on 6-point scales anchored by *disagree 100%* and *agree 100%*. Ratings of agreement within risk estimators were correlated ( $r_s = .72$  and  $.81$  for high- and low-risk estimators, respectively). Therefore, separate indexes were calculated representing subjects' mean agreement with the four estimates given by the high-risk estimator and the mean agreement with the four estimates given by the low-risk estimator.

*Discriminant validity of knowledge and affect.* A number of broad individual difference measures were administered to establish the discriminant validity of our knowledge and affect predictors and to ensure that the obtained findings were not due to systematic confounds associated with knowledge and affect. The following measures were assessed because they potentially covaried with knowledge and/or affect: (a) verbal IQ (*California Test of Mental Maturity*, 1963), (b) chronic anxiety (Tellegen, 1982), (c) social closeness (Tellegen, 1982), (d) extraversion (Digman & Inouye, 1986), (e) neuroticism (Digman & Inouye, 1986), and (f) need for cognition (Cacioppo & Petty, 1982). None of these variables could account for the obtained effects. That is, none attenuated the reported effects when entered separately into the analyses as covariates. Thus, these potential confounds are not responsible for the relations documented between subjects' information-processing strategies and their knowledge and affect intensity.<sup>2</sup>

## RESULTS

Subjects' working knowledge and the rated intensity of their affective reactions were used to cross classify subjects into four groups, yielding 44 subjects low in both knowledge and affect, 46 low in knowledge but high in affect, 41 high in knowledge but low in affect, and 41 high in both (as noted earlier, the correlation between measures was  $r = .09$ , *ns*).

#### *Attitudes Toward AIDS Prevention Strategies*

Subjects' rated attitudes toward AIDS prevention were generally favorable (see Table 1). A Knowledge (high vs. low)  $\times$  Affect (high vs. low) analysis of variance (ANOVA) yielded no differences in attitudes across conditions.

#### *Evaluative Thoughts About the AIDS Risk Estimates*

The numbers of thoughts that subjects indicated were analyzed in a Knowledge (high vs. low)  $\times$  Affect (high vs. low) ANOVA. As displayed in Table 1, knowledgeable subjects listed more thoughts overall than less knowledgeable ones,  $F(1, 164) = 13.70$ ,  $p < .001$ . In addition, the significant interaction between knowledge and affect,  $F(1, 164) = 4.38$ ,  $p < .05$ , revealed that knowledgeable people with high levels of affect engaged in more

**TABLE 1: Mean Initial AIDS Risk Attitudes, Thoughts About Risk Estimates, and Agreement With Risk Estimates as a Function of Knowledgeability and Affective Intensity**

Measure	Low Knowledge		High Knowledge	
	Low Affect	High Affect	Low Affect	High Affect
Initial attitude toward AIDS risk prevention	13.02 (1.26)	12.74 (2.11)	12.41 (1.47)	12.51 (1.86)
Total number of thoughts	5.95 (2.21)	5.93 (1.92)	6.34 (1.73)	7.71 (1.84)
Proportion positive thoughts to low-risk estimates	.17 (.30)	.15 (.29)	.10 (.22)	.13 (.22)
Proportion negative thoughts to low-risk estimates	.71 (.37)	.71 (.34)	.74 (.34)	.73 (.33)
Proportion positive thoughts to high-risk estimates	.56 (.40)	.54 (.42)	.48 (.42)	.60 (.39)
Proportion negative thoughts to high-risk estimates	.29 (.35)	.35 (.40)	.36 (.37)	.22 (.30)
Rated agreement with low-risk estimates	2.69 (.94)	2.85 (.83)	2.84 (.86)	3.02 (.92)
Rated agreement with high-risk estimates	3.93 (.81)	4.10 (.68)	3.93 (.83)	4.01 (.78)

NOTE: Higher numbers represent more favorable attitudes toward AIDS risk prevention strategies (on a 15-point scale), greater proportion of each type of thought, and greater agreement (on a 5-point scale). Standard deviations are in parentheses.

extensive, detailed analysis of the risk estimates than low knowledge subjects ( $p < .01$ ). High-knowledge, low-affect subjects, however, did not differ from the other subject groupings. To control for these differences in raw number of thoughts, evaluative favorability was calculated by taking the number of favorable or unfavorable thoughts to each risk estimator (aggregated across the four scenarios) as a proportion of the total number of thoughts listed to that estimator (see Table 1). For ease of presentation, overall favorability indexes to the high- and the low-risk estimator were formed by subtracting the mean proportion of unfavorable thoughts from the mean proportion of favorable ones.

The favorability indexes were analyzed by a Knowledge (high vs. low)  $\times$  Affect (high vs. low)  $\times$  Risk Estimates (high risk vs. low risk) ANOVA with repeated measures on the last factor. More positive (vs. negative) evaluations were generated to the high-risk estimates ( $M = .24$ ) than the low-risk estimates ( $M = -.58$ ,  $p < .001$ ). More important, the favorability scores suggested that knowledge in the absence of intense affect was associated with a critical processing orientation. Thus the significant interaction between knowledge and affect,  $F(1, 164) = 4.12$ ,  $p < .05$ , revealed that knowledgeable subjects with minimal affect were somewhat more negative in general to the risk estimators ( $M = -.26$ ) than the other subject groupings ( $M = -.10$ ,  $p < .07$ ).

To evaluate the extent of defensive bias in subjects' cognitive responding, subjects' initial attitudes toward AIDS risk prevention were correlated with the favorability of their thoughts toward the scenario risk estimates. For ease of presentation, reactions to the low- versus high-risk estimates were combined by subtracting the proportion of positive thoughts to the low-risk estimator across the four scenarios from the proportion generated to the high-risk estimator. (Comparable effects were obtained in the analyses that separately evaluated reactions to each estimator.) Across all subjects, biased

processing was evident in support of initial attitudes, such that greater initial favorability toward safe-sex AIDS-preventive behaviors was associated with a greater percentage of favorable thoughts toward the high-risk than the low-risk estimator,  $r = .17$ ,  $p < .05$ . However, as shown in Table 2, these relations did not prove uniform across the knowledge and affect groupings. As predicted, differential favorability was significantly associated with attitudes only for subjects with extensive knowledge paired with intense affect. That is, for high-knowledge, high-affect subjects, more favorable attitudes toward AIDS prevention were associated with greater favorability to the high- than the low-risk estimates,  $r = .52$ ,  $p < .001$ . Attitudes were not significantly correlated with differential favorability for any other combination of knowledge and affect. When the correlations within groups were compared (by transforming the correlations to standard scores, Cohen & Cohen, 1983), the correlation for the high-knowledge, high-affect group was significantly larger than that for knowledgeable subjects without strong affect,  $z = 4.88$ ,  $p < .001$ , and was also larger than that for low-knowledge subjects,  $z = 5.57$ ,  $p < .001$ .<sup>3</sup>

To further elucidate the nature of subjects' processing of the risk estimates, the content of the thought listings was classified as positive or negative *reactions* to the material presented in the risk scenarios or as positive or negative *new additions* to this material; verbatim restatements of the estimates and irrelevant thoughts were not included in these analyses. The frequency of each type of thought was converted to a percentage (i.e., number of that type of thought divided by total number of thoughts listed). To examine how these thoughts contributed to biased processing of the risk estimates, indexes were calculated to reflect the differential favorability of reactions (i.e., percentage positive thoughts minus percentage negative) to the high-risk versus the low-risk scenarios and the differential favorability of new

**TABLE 2: Correlations Between Attitude Toward AIDS-Preventive Behaviors and Reactions to Low- Versus High-Risk Scenarios as a Function of Knowledgeability and Affect Intensity**

Measure	Low Knowledge		High Knowledge	
	Low Affect	High Affect	Low Affect	High Affect
Evaluative favorability of thoughts to high- versus low-risk scenarios	.07	.09	.04	.52**
Rated agreement with high- versus low-risk scenarios	.21	.20	.09	.36*

NOTE: Correlations represent the association between initial attitudes toward AIDS prevention and favorability of subjects' thoughts or rated agreement concerning the AIDS risk estimates in the scenarios. Biased responses congruent with attitudes are indicated by significant positive correlations.

\* $p < .05$ . \*\* $p < .01$ .

additions to the high- versus the low-risk scenarios. Essentially, these favorability content estimates revealed that the biased processing of subjects high in knowledge and affect reflected both biased reactions to the risk estimates and biased new additions to the risk estimates. That is, for knowledgeable, high-affect subjects, favorable attitudes toward AIDS prevention were associated with greater positive than negative *reaction*-type thoughts to the high- than the low-risk scenarios,  $r = .52$ ,  $p < .01$ , and with greater positive than negative *new addition*-type thoughts to the high- than low-risk scenarios,  $r = .42$ ,  $p < .05$ . These were the only significant relations obtained for any subject grouping ( $r$ s ranged from .11 to  $-.09$  for the other subject groupings) and, furthermore, were significantly greater than those obtained for the other knowledge and affect groups ( $p$ s  $< .05$ ).

#### Agreement

The agreement ratings displayed in Table 1 were analyzed in a Knowledge (high vs. low)  $\times$  Affect (high vs. low)  $\times$  Risk Estimates (high risk vs. low risk) ANOVA with repeated measures on the last factor. The only significant effect to emerge was that subjects agreed more with the high-risk scenarios ( $M = 3.99$ ) than with the low-risk scenarios ( $M = 2.85$ ),  $F(1, 164) = 95.01$ ,  $p < .001$ .

To determine whether biased evaluation of the scenarios generated biased agreement, agreement ratings were correlated with subjects' attitudes toward AIDS prevention. To simplify presentation, reactions to the high- and the low-risk estimates were combined into a single index by subtracting mean agreement to the low-risk scenarios from mean agreement to the high-risk scenarios. (Findings comparable to those reported below were obtained when the agreement ratings to each scenario were analyzed separately.)

A self-protective bias would be evident if subjects with favorable attitudes toward AIDS prevention agreed more

with predictions of greater (vs. lesser) AIDS risk and subjects with unfavorable attitudes agreed more with predictions of lesser (vs. greater) AIDS risk. Indeed, when the data from the full sample were considered, subjects with more favorable attitudes indicated greater agreement with the high-risk over the low-risk estimates,  $r = .22$ ,  $p < .01$ . Furthermore, consistent with our predictions, this correlation between attitude and differential agreement varied with subjects' knowledge and affect (see Table 2). Significant bias was apparent only for subjects whose extensive knowledge concerning AIDS-preventive safe-sex behaviors was accompanied by intense affect concerning AIDS prevention ( $r = .36$ ,  $p < .05$ ). Differential agreement was not significantly associated with attitude favorability for any of the other knowledge and affect conditions. Also as expected, comparisons between conditions revealed that high-knowledge, high-affect subjects were significantly more biased than high-knowledge, low-affect subjects,  $z = 2.55$ ,  $p < .05$ . However, neither of the high-knowledge groups differed from low-knowledge subjects.

#### DISCUSSION

This experiment demonstrated that attitude-relevant knowledge can contribute to biased, defensive processing of new information as well as to objective, critical processing. Whether knowledge enabled biased or objective processing depended on the intensity of subjects' affect concerning the attitude issue, AIDS prevention.

A defensive, attitude-protective strategy was apparent among knowledgeable subjects who reported high levels of fear concerning AIDS risk. These intense affective reactions appeared to motivate subjects to use their extensive knowledge to protect and bolster their attitudes on AIDS prevention strategies. Fearful, knowledgeable subjects generated evaluative thoughts about the AIDS risk scenarios that were congruent with their attitudes: Those with favorable AIDS prevention attitudes generated more positive and fewer negative thoughts about scenarios suggesting high risk of AIDS than scenarios suggesting low risk, whereas those with less favorable AIDS prevention attitudes generated more positive thoughts about low-risk scenarios than high-risk ones. This pattern of biased processing was apparent both on evaluative thoughts representing reactions to the information provided in the risk scenarios and on thoughts that reflected new, original information drawn from subjects' own store of knowledge concerning AIDS prevention. High-knowledge, high-affect subjects also indicated biased agreement with the conclusions of the scenarios. These subjects were significantly more likely to agree with scenario estimates of risk that were congenial with, rather than opposed to, their own attitudes



toward AIDS prevention: Subjects with favorable AIDS prevention attitudes were especially likely to agree with high-risk estimates over low-risk estimates, whereas those with less favorable attitudes were more likely to agree with low- than with high-risk estimates.

In contrast, knowledgeable subjects who reported minimal affect appear to have adopted an objective, critical processing orientation. These subjects had little motivation to adopt a defensive, attitude-protective stance, and instead used their considerable store of information to critically evaluate the validity of the AIDS risk estimates in the scenarios. Thus subjects with considerable knowledge but minimal affect generated proportionally fewer favorable thoughts to high-risk scenarios and proportionally more unfavorable thoughts to low-risk scenarios than other participants. These subjects' enhanced negativity and apparently impartial use of their extensive knowledge base are consistent with earlier research on working knowledge that was conducted with a relatively "cool," non-emotion-producing attitude topic, preservation of the environment (Wood, 1982; Wood et al., 1995). The present findings differ from earlier research, however, in that high-knowledge, low-affect subjects did not generate a greater number of thoughts overall than less knowledgeable ones. Thus the unbiased, objective use of knowledge in the present experiment may reflect an active, critical evaluation of new material, or it may reflect a passive process in which knowledgeable people are relatively unresponsive to new information because of their considerable existing store (e.g., the decelerating set-size effect, Davidson, Yantis, Norwood, & Montano, 1985).

Although we were able to document clearly the unique patterns of evaluation associated with knowledgeable subjects, our study provided less insight into the processing strategies of subjects with minimal knowledge. We expected that subjects with little knowledge would lack the necessary information to conduct a detailed evaluation of the risk estimates and would therefore demonstrate limited, superficial thought in interpreting this information. Indeed, their lack of AIDS prevention knowledge seemed to attenuate their ability to engage in any form of systematic evaluation. These subjects generated few thoughts overall. Furthermore, they did not demonstrate the profile of negative evaluations to both high- and low-risk estimates that was evidenced by high-knowledge, low-affect subjects. They also did not demonstrate the profile of attitude-defensive processing evidenced by high-knowledge, high-affect subjects; low-knowledge subjects did not show more favorable response to attitude-congenial than to attitude-challenging estimates, either in the favorability of their thoughts or in their agreement ratings.

In past research, people with little knowledge were found to rely on simple, efficient decision rules, or cognitive heuristics, to evaluate a message (Wood & Kallgren, 1988; Wood et al., 1985). The absence of any salient, consensually agreed-on heuristic cues in the present research paradigm may have limited our ability to document the process by which low knowledge subjects evaluated the risk estimates. Although there was no evidence of biased evaluation among our low-knowledge, high-affect subjects, we speculate that, in contexts outside our experiment, these individuals may engage in forms of biased processing that do not require detailed, systematic analysis. The considerable affect associated with AIDS prevention for these people may stimulate forms of biased processing that do not require an extensive information base. For example, low-knowledge people may adopt a strategy of selective exposure and/or attention to information that allows them to avoid challenging views and to focus on congenial positions (Chaiken et al., 1996; Liberman & Chaiken, 1992). These people may also use heuristic reasoning in a biased fashion; they may selectively rely on cues that provide a basis for derogating challenging information (e.g., any personal weaknesses in those holding opposing views) and cues that would suggest favorable reaction to congenial views (e.g., personal strengths of those with like-minded views). Thus the rather surprising finding that intense affect alone (i.e., when knowledge is low) is not sufficient for biased processing may be due to the rather narrow detection of bias in the present research paradigm.

At a general level, our results are congruent with the idea that persuasion variables can affect ability to process attitude-relevant information as well as motivation to engage in such processing (Petty & Cacioppo, 1986; Petty et al., 1994). In the present research, working knowledge emerged as an ability-related variable, enabling subjects to conduct a systematic evaluation of the risk estimates. The intensity of affect associated with the issue served as a motivational variable that biased evaluation of the estimates in a direction congruent with subjects' attitudes. Thus working knowledge provided the ability to critically evaluate new information but did not itself instigate a validity-seeking or a defensively oriented processing strategy. When subjects possessed intense affect, knowledge enabled a detailed, *biased* evaluation of the content of incoming information. In this role, knowledge likely generates attitude stability because it confers the ability to defend and bolster existing attitudes against threatening material (Chaiken et al., 1996). In the absence of intense affect, an extensive knowledge base enabled subjects to critically evaluate

the strengths and weaknesses of new material whether it supported or opposed their views. This objective, critical use of knowledge generates attitude stability and resistance to persuasion by conferring the ability to detect weaknesses in all but the most cogently reasoned material (Wood, 1982; Wood et al., 1995).

#### NOTES

1. The idea that biased judgment effects are found primarily with knowledgeable subjects is one version of the argument that biased judgment emerges with strong attitudes. Thus more favorable reactions to attitude-congenial than attitude-opposing information emerge primarily when attitudes are highly accessible (Houston & Fazio, 1989) and extreme, rather than moderate (Miller et al., 1993).

2. The finding that verbal IQ did not generate effects comparable to working knowledge provides additional confirmation of earlier research demonstrating the discriminant validity of the working knowledge measure. In earlier studies, attitude change on a given topic could not be predicted from working knowledge on unrelated issues (Wood, 1982; Wood, Biek, Nations, & Chaiken, 1994). It is therefore appropriate to interpret working knowledge as a topic-specific measure of the extent of attitude-relevant information accessible from memory and to conclude that its effects are not confounded with broader dispositional variables such as verbosity or verbal IQ.

3. In addition, these analyses were conducted using a regression approach (see Aiken & West, 1991). Subjects' initial attitudes, knowledge, affect, and appropriate interactions were entered as predictors of (a) differential evaluation of the high- and low-risk scenarios and then (b) differential agreement with the high-versus low-risk scenarios. The results of the regression analyses were essentially comparable to those reported in the text. That is, in the analyses on evaluative thoughts, decomposition of the interaction among initial attitudes, knowledge, and affect (Aiken & West, 1991) revealed a significant relation between initial attitudes and evaluation among the high-knowledge, high-affect subjects,  $t = 3.83$ ,  $p < .01$ , a smaller yet still significant relation among the low-knowledge, high-affect group,  $t = 2.12$ ,  $p < .05$ , and nonsignificant relations for high-knowledge, low-affect subjects,  $t = 1.39$ , and low-knowledge, low-affect subjects,  $t = 0.22$ . The analyses on agreement ratings generated a similar pattern. Decomposition of the three-way interaction revealed that initial attitudes and agreement ratings were related for high-knowledge, high-affect subjects,  $t = 2.97$ ,  $p < .05$ , but not for low-knowledge, high-affect subjects,  $t = 0.68$ ,  $ns$ , high-knowledge, low-affect subjects,  $t = 1.13$ ,  $ns$ , or low-knowledge, low-affect subjects,  $t = 0.94$ ,  $ns$ .

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Received August 24, 1994

Revision accepted February 20, 1995