Journal of Personality and Social Psychology
1992, Vol. 63, No. 4, 568-584

0022-3514/92/$3.00

Motivated Skepticism: Use of Differential Decision Criteria for Preferred and Nonpreferred Conclusions

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Three experiments show that information consistent with a preferred conclusion is examined less critically than information inconsistent with a preferred conclusion, and consequently, less information is required to reach the former than the latter. In Study 1, Ss judged which of 2 students was most intelligent, believing they would work closely with the 1 they chose. Ss required less information to decide that a dislikable student was less intelligent than that he was more intelligent. In Studies 2 and 3, Ss given an unfavorable medical test result took longer to decide their test result was complete, were more likely to retest the validity of their result, cited more life irregularities that might have affected test accuracy, and rated test accuracy as lower than did Ss receiving more favorable diagnoses. Results suggest that a core component of self-serving bias is the differential quantity of cognitive processing given to preference-consistent and preference-inconsistent information.

In her book *On Death and Dying,* Elisabeth Kubler-Ross (1969) described the initial reaction of a patient on being informed of her terminal illness (p. 38). The patient reacts first by considering the possibility that her X-rays were "mixed-up" with those of another patient. When that explanation cannot be confirmed, the patient leaves the hospital and seeks out a succession of new physicians in hopes of receiving a "better explanation" for her medical condition.

The image of denial portrayed in this anecdote is quite consistent with the more general view of motivated reasoning presented in this article. When confronted with threatening or otherwise objectionable information, a search for more palatable alternative explanations often ensues. It seems only natural, for example, that an individual faced with an unfavorable medical diagnosis would actively search for more benign interpretations of this unwelcome news. Because this search is likely to be at least partially "successful"—plausible alternative interpretations can be generated for virtually any piece of data—additional medical opinions are likely to be required before the individual is willing to accept the validity of the unfavorable diagnosis.

Contrast this image with that of an individual receiving a favorable medical diagnosis. Misassigned X-rays and misdiagnoses are equally plausible alternative explanations for both favorable and unfavorable medical forecasts. Yet, an individual given a favorable report seems unlikely to even consider the possibility that such factors might account for their diagnosis. Rather, favorable information seems much more likely to be accepted at face value without need for further corroboration. Several doctors may be required to provide convincing proof of illness, but one is generally enough to provide convincing proof of health.

This article examines the notion that people are less skeptical consumers of desirable than undesirable information. Three experiments are reported that examine the hypothesis that information consistent with a preferred judgment conclusion is examined less critically than information inconsistent with a preferred conclusion, and consequently, less information is required to reach a preference-consistent conclusion than a preference-inconsistent one. More generally, our goal in this article is to integrate research on the selective nature of cognitive resource allocation with that on the historically problematic issue of motivational biases in judgment by suggesting that one central way that motivational factors affect judgments is through their tendency to affect how critically people examine information that they do and do not wish to receive.

The Problem of Motivated Reasoning

The intuition that hopes, wishes, apprehensions, and fears affect judgments is compelling and persistent. Turning this intuition into a viable empirical and theoretical fact, however, has proved to be one of the most recalcitrant problems in the history of experimental psychology (Erdelyi, 1974; Miller & Ross, 1975).

The results of Study 1 were presented at the 1991 Annual Convention of the American Psychological Society, Washington, DC. The results of Studies 2 and 3 were presented at the 1991 Annual Convention of the Midwestern Psychological Association, Chicago. This research was supported by funds supplied by the Applied Psychology Center at Kent State University.

We thank the many undergraduate research assistants who served as experimenters and coders for the studies reported here: Angela Battaglia, Bob Boughman, Mike Hovancek, Sunny Metzger, Scott Nevel, Scott Norris, Debbie Owens, Tony Ryland, Lisa Siciliano, Tim Strach, and Patrick Wise. We also thank James Hilton, Charlie Perdue, Bill von Hippel, Allen Townsend, and three anonymous reviewers for their helpful comments on earlier versions of this article.

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Yet, after reaching its nadir with the publication of Tetlock and Levi's (1982) essay on the intractability of distinguishing "cognitive" and motivational explanations for self-serving attributional biases, progress in conceptualizing the role of motivational factors in judgment processes has resurged (Higgins & Sorrentino, 1990; Sorrentino & Higgins, 1986). At the empirical level, a variety of methodological strategies have been used to support the motivated nature of self-serving judgments either by documenting the mediational role of arousal (Brown & Rogers, 1991; Gollwitzer, Earle, & Stephan, 1982; Stephan & Gollwitzer, 1981) or by using one of a number of techniques of manipulating the motivational significance of information while holding potentially confounding informational differences constant (Ditto, Jemmott, & Darley, 1988; Holton & Pyszczynski, 1989; Kunda, 1987; Liberman & Chaiken, in press).

At the theoretical level, several researchers have responded to Tetlock and Levi's (1982) call for greater specificity in the conceptualization of the mechanisms underlying motivational bias (Kruglanski, 1980, 1990; Kunda, 1987, 1990; Pyszczynski & Greenberg, 1987). The goal of these researchers is to move beyond the simple assertion that motivations affect judgments and to attempt to identify the specific point or points at which motivational processes enter into, and how exactly they perturb, the generic information-processing sequence. A recent review of the motivated-bias literature (Kunda, 1990), however, reveals considerably more empirical support for the proposition *that* motivational factors affect judgments than direct evidence for exactly *how* this process occurs (Liberman & Chaiken, in press).

Within the motivated-judgment literature, the empirical finding that has received the greatest amount of attention and controversy in recent years is the robust tendency of individuals to perceive information that is consistent with a preferred judgment conclusion (preference-consistent information) as more valid than information that is inconsistent with that conclusion (preference-inconsistent information). Thus, whether the information concerns one's intelligence (Wyer & Frey, 1983), social sensitivity (Pyszczynski, Greenberg, & Holt, 1985), professional competence (Beckman, 1973), or vulnerability to future illness (Ditto et al., 1988; Kunda, 1987), preference-consistent feedback (e.g., information suggesting high intelligence or low vulnerability to illness) is perceived as valid, accurate, and internally caused, whereas preference-inconsistent feedback (e.g., information suggesting low intelligence or high vulnerability to illness) is perceived as less valid, less accurate, and more likely to be externally explainable.

This is not to say, however, that individuals never acknowledge the validity of preference-inconsistent information. Albeit perhaps reluctantly, most people accept a variety of negative beliefs about themselves (Markus & Wurf, 1987) and even among individuals confronted with diagnoses of cancer, profound denial reactions are clearly the exception rather than the rule (Aitken-Swan & Easson, 1959; Gilbertson & Wangensteen, 1962). As originally noted by both Heider (1958) and Festinger (1957), the "rational" aspects of "rationalization" cannot be ignored. Judgments seem best characterized as a compromise between the wish to reach a particular conclusion and the plausibility of that conclusion given the available data (Heider, 1958; Kunda, 1990; Pyszczynski & Greenberg, 1987). Any analysis of motivated information processing, therefore, must account for both differential perceptions of the validity of preference-consistent and preference-inconsistent information and the ultimate responsiveness of individuals to preference-inconsistent conclusions.

A Quantity of Processing View of Motivated Reasoning

One deceptively simple explanation that can account for both aspects of this delicate balance is that information consistent with a preferred conclusion is subjected to a less extensive and less critical cognitive analysis than is information inconsistent with that conclusion.

A central theme underlying the past 2 decades of social cognition research is that individuals think more deeply about information in some situations than in others. Emerging out of mid-1970s research documenting the oftime "mindless" nature of human action (e.g., Langer, 1978; Tversky & Kahneman, 1974), the notion that individuals selectively allocate their cognitive resources has become a central tenet of major theoretical treatments of persuasion (Chaiken, 1987; Petty & Cacioppo, 1986) and social judgment (Bargh, 1984; Chaiken, Liberman, & Eagly, 1989; Fiske & Neuberg, 1990). Research both within and outside these theoretical frameworks has documented a host of situational factors that seem to affect the degree to which incoming information is subjected to effortful cognitive analysis, including the personal relevance of the information (e.g., Borgida & Howard-Pitney, 1983; Petty, Cacioppo, & Goldman, 1981), the extent to which individuals must justify their conclusions to others (e.g., Tetlock, 1983, 1985), and the consistency of the incoming information with prior expectations (e.g., Hilton, Klein, & von Hippel, 1991; Pyszczynski & Greenberg, 1981).

More specific to the current point, the evaluative implications of incoming information have also been shown to affect how extensively that information is processed. A diverse body of research suggests that negative social information is more likely than positive social information to trigger cognitive analysis. Within the attributional framework, for example, research on "spontaneous" causal reasoning has shown that individuals report more attributional thought in response to failure feedback than success feedback (e.g., Wong & Weiner, 1981). This tendency has been shown to be independent of subjects' expectations for receiving the different types of feedback (Bohner, Bless, Schwarz, & Strack, 1988).

Using a very different methodological approach, Pratto and John (1991) found longer color-naming latencies in a Stroop (1935) color-interference paradigm when subjects named the color of undesirable trait words than when they named the color of desirable trait words. Pratto and John argued that attentional resources are automatically directed toward negative social information, probably the result of the adaptive significance of monitoring undesirable outcomes.

Assuming that preference-consistent information induces a more positive affective response than preference-inconsistent information, research on the effects of mood on information processing provides additional support. Schwarz (1991) reviewed a variety of studies in the areas of decision making, problem solving, and persuasion showing that experimentally

induced negative affect initiates effortful, detailed-oriented cognitive analysis, whereas positive affect is associated with less effortful, heuristic-based analysis (e.g., Bless, Bohner, Schwarz, & Strack, 1990; Isen, 1984; Mackie & Worth, 1989; Worth & Mackie, 1987). Naturally occurring negative affect (i.e., depression) has similarly been shown to result in relatively vigorous analytical and information-seeking strategies (Marsh & Weary, 1989).

The notion that preference-consistent and preference-inconsistent information may receive differential amounts of processing is also consistent with recent theoretical models of motivated judgment. Kruglanski (1980, 1990) argued that because the information-processing sequence has no natural termination point, motivations (or what he refers to as *epistemic goals*) can affect judgment outcomes by delaying or hastening the "freezing" of the epistemic search. More specific to the current point, he suggested that the desire to reach a particular judgment conclusion (i.e., the need for specific closure) results in individuals engaging in a more extensive search for alternative explanations (i.e., delayed freezing) when incoming information is inconsistent with the desired conclusion than when it is consistent with the conclusion.

The same assymetry is implicit in Psyzczynski and Greenberg's (1987) biased hypothesis-testing model of motivated inference. Psyzczynski and Greenberg (1987) argued that when individuals encounter information with unfavorable implications for the self, they are more likely to generate multiple hypotheses for testing, engage in a more extensive search for mitigating information, and devote greater processing capacity to evaluating relevant evidence than when confronted with information that is more palatable to the self.

An eclectic body of theory and research, therefore, supports the conclusion that information consistent with a preferred judgment conclusion is less likely to initiate intensive cognitive analysis than is information inconsistent with that conclusion. This assymetrical quantity of processing should, in turn, lead individuals to be less critical consumers of the former than of the latter. Because preference-consistent information is relatively unlikely to initiate causal thinking, alternative explanations for the information are unlikely to be considered. Consequently, the validity of preference-consistent information should tend to be rather uncritically accepted. The negative affect generated by information perceived to be preference inconsistent, on the other hand, should be more likely to initiate an effortful correction process (Gilbert, Pelham, & Krull, 1988; Quatrone, 1982) in which the initial characterization is adjusted to take into account additional factors that may plausibly be considered to explain the outcome. Assuming that more extensive analysis is likely to reveal multiple plausible explanations for virtually any piece of data (Kruglanski, 1990), preference-inconsistent information is more likely than preference-consistent information to be perceived of as "confounded" (i.e., explainable in more than one way) and its validity perceived to be less certain.

This analysis does not suggest, however, that individuals will never acknowledge the validity of preference-inconsistent information. In sharp contrast to a defensive inattention conceptualization of motivated information processing, the current perspective suggests that individuals are quite attentive to preference-inconsistent information, and if confronted with information of sufficient quantity or clarity, should eventually acquiesce to a preference-inconsistent conclusion. Rather than leading individuals to believe whatever they prefer to believe, the differential quantity of processing initiated by preference-consistent and preference-inconsistent information should bias judgments more subtlely by affecting the amount of information required to reach valenced conclusions.

Stated another way, people may be said to use differential decision criteria for preference-consistent and preference-inconsistent conclusions. Because individuals are relatively unlikely to consider alternative explanations for preference-consistent information, relatively little information (or information of relatively poor quality) should be required for people to arrive at a preference-consistent conclusion. In contrast, individuals should approach preference-inconsistent information more skeptically. Because any given piece of preference-inconsistent information is more likely to be perceived of as confounded, it should require somewhat more information (or information of relatively high quality) to reach a preference-inconsistent conclusion.

From this perspective, the differential perceptions of the validity of preference-consistent and preference-inconsistent information occurs because of the stricter criteria applied to the latter. Within the self-serving attributional bias paradigm, for example, there seems little doubt that if experimenters persisted in presenting failure feedback, subjects would eventually relent to an internal attribution for their poor performance. The differential attributions of success- and failure-feedback subjects for a single test result, in the current view, simply reflect the more skeptical stance taken (i.e., the stricter decision criterion used) by subjects presented with information inconsistent with their preferred conclusion. Once again, one test result may be enough information for an individual to accept a preferred conclusion but may not be enough to convince an individual of the validity of a nonpreferred one.

No research has examined the prediction that less information is required to reach a preference-consistent conclusion than a preference-inconsistent one. Because virtually all research on motivational bias is interested in differential judgment as its primary dependent measure, experimental designs are used in which the amount of information presented to subjects is held constant and differences in judgments are measured. To obtain a direct measure of the amount of information required to reach preferred and nonpreferred conclusions, however, the opposite approach needs to be taken. In Study 1 therefore, an attempt is made to "hold the judgment constant" and measure the amount of information required to make that judgment. Consistent with the proposed analysis, it is predicted that subjects will use differential decision criteria for preferred and nonpreferred judgment conclusions. That is, subjects presented with preference-consistent information should require less information to reach a preferred conclusion than subjects presented with preference-inconsistent information should to reach a nonpreferred one.

Study 1

The goal of Study 1 was to confront some subjects with a judgment situation in which they had a clear preference for one

conclusion over another, present them with information that was either consistent or inconsistent with their preferred conclusion, and then obtain some measure of the amount of information needed to arrive at the preference-consistent or preference-inconsistent conclusion, respectively. To do this in a way that effectively ruled out alternative explanations based on differential information available to different groups of subjects, we chose to examine our hypotheses within the context of an interpersonal judgment (e.g., Holton & Pyszczynski, 1989). Interpersonal judgments are particularly useful in ruling out information-based counterexplanations for motivational effects for the simple reason that it is much easier to control what subjects know about a fictitious stimulus person than it is to control what they know about themselves.

Method

Subjects

Subjects were 67 female undergraduates from general psychology courses at Kent State University who participated for course credit. One subject was excluded for failure to understand the experimental instructions. Another 6 subjects were excluded for failing to meet an additional inclusion criterion (discussed later), leaving a total of 60 subjects, 15 in each of four experimental conditions.

College Admissions Cover Story

On arriving at the laboratory room, subjects had their photograph taken and were then given 10 min to complete an 18-question analogy test. An experimenter explained that the picture and test were for another part of the study that subjects would be told more about in a few minutes.

When subjects had completed the analogy test, it was explained that the present study would consist of two tasks designed to mirror a college admissions decision. First, subjects would be presented with information about two fellow general psychology students and asked to make a decision regarding which one was the more intelligent. Second, subjects would engage in a short problem-solving task with the individual they chose as most intelligent (both of the "contestants" were ostensibly in a nearby room). The problem-solving task was described as "not difficult—but it does require that you and your partner work closely together—and that you learn to trust your partner with your feelings and intuitions." The whole session, it was said, was an attempt to mimic a scenario in which a college admissions official must use limited information to evaluate individuals' intelligence, and then those evaluated as most intelligent would "come to your university and work with you on a more personal level."

Finally, it was explained that this was only Part 1 of the study. Subjects were told that they had the option of coming back for Part 2 of the study in which they would serve as one of the contestants. Thus, it was explained that both of the contestants to be evaluated had previously participated in Part 1 of the study.

Intelligence Evaluation Task

Subjects were told that they would see information packets about the two contestants consisting of (a) a photograph of each contestant (just like the photograph that had previously been taken of the subject), (b) each contestant's high school GPA, and (c) an evaluation form completed about each contestant by that contestant's partner in the problem-solving task that each had participated in when they were in Part 1 of the study.

Finally, subjects were told that they would also be shown each contestants' performance on an 18-question analogy test (just like the test subjects had completed). Their inspection of these exam performances, however, would be complicated by one final fact. Admissions officials, it was said, are under tremendous time pressures and must make their decisions quickly while not forsaking accuracy. To simulate this speed–accuracy compromise, subjects were told that they would be shown the contestants' responses one question at a time. Each contestant's test questions had been separated and each question taped to an index card. On each card, the contestant's response was circled (ostensibly by the contestant), along with an indication (in red) of whether the question was answered correctly or incorrectly (if the response was incorrect, the correct response was circled in red). Subjects were told to examine both contestants' responses to the first question, then to turn to the second question, and so on. Both contestants responded to the same set of analogy questions but a different set than those answered by the subject herself. The key section of the instructions then went on as follows:

> What we want you to do is to look at these items *one question at a time*—without looking back through them—and *as soon as you feel that you have seen enough items to make a decision*—STOP—and make your decision regarding *which contestant is most intelligent*. In other words, we want you to try and make your decision looking at as *few of the questions as possible . . . but at the same time still try to make that decision with a reasonable degree of accuracy.* [emphasis in original]

When the experimenter was assured that the subject understood the task, the subject was given a few minutes to review the pictures, GPA information, and evaluation forms. The subject was then given the stacks of analogy questions and told to let the experimenter know when she had made her decision.

Dependent Measures

After the decision, the experimenter made note of which contestant the subject chose as most intelligent and the *number of cards the subject required to make their intelligence decision.* Subjects then rated their *surprise regarding the outcome of their intelligence decision* on a 9-point scale (1 = *not at all surprised* and 9 = *very surprised*). More specifically, subjects were asked "Did the individual that you expected to be the most intelligent actually turn out to be the most intelligent? In other words, how surprised were you by which contestant turned out to be the most intelligent?" Subjects next rated both *contestants' performances* on the analogy questions on a 9-point scale (1 = *very poor/below average* and 9 = *very good/above average*), estimated the *percentage of analogy questions that each contestant had answered correctly,* and evaluated each contestant on four dimensions (intelligent–unintelligent, logical–illogical, likable–dislikable, and attractive–unattractive) on 9-point scales.

Preference Manipulation

The goal of Study 1 was to confront some subjects with a judgment situation in which they had little or no preference for one conclusion over another and others with a situation in which they had a clear a priori preference for one conclusion. This was accomplished by creating a contingency between the intelligence decision and future interaction and having some subjects decide which of two equally likable contestants was most intelligent and facing other subjects with a choice between a likable contestant and a thoroughly dislikable one.

The likability of the contestants was manipulated using the evaluation forms that had supposedly been completed about them by their previous partner. The evaluation forms consisted of three sections of

9-point rating scales in which the contestant's partner ostensibly rated *the problem-solving task* on three dimensions (e.g., enjoyable–unenjoyable), their *feelings during the problem-solving task* on three dimensions (e.g., anxious–calm), and their *partner in the problem-solving task* (i.e., the contestant) on eight dimensions (e.g., intelligent–unintelligent and likable–dislikable). In addition, there was a space at the end of the form for additional comments.

For subjects assigned to the *no-preference conditions,* the likability of both contestants reflected by the partners' evaluation forms was equal and quite high (overall $M = 7$, where 9 represents the positive pole of each scale). Nothing was written on either contestants' form in the space left for additional comments.

In contrast, subjects assigned to the *preference conditions* read evaluation forms suggesting two contestants who differed dramatically in likability. For one contestant (the comparison contestant), the evaluation form was identical in both the no-preference and preference conditions (i.e., suggesting high likability). For the other contestant (the target contestant), however, the evaluation form in the preference conditions suggested that he was quite dislikable. For example, the target contestant's partner rated the problem-solving task as unenjoyable (2 on a scale where 9 was most enjoyable) and the target contestant himself as dislikable (1 on a scale where 9 was most likable). In addition, in the space for additional comments, the following comment appeared (in handwriting intended to suggest a female partner): "I think the task would probably have been fun if it weren't for my partner. He thought he was never wrong and he made me feel stupid (like I didn't know what I was talking about). *Rude!!!*" (emphasis in original).

The dislikability of the target contestant conveyed by the preference-condition evaluation form, in conjunction with the contingency of future interaction with whomever was chosen as most intelligent (i.e., the problem-solving task), was intended to create a preference in these conditions for the target contestant to be seen as less intelligent. That is, all else being equal, subjects in the preference conditions would rather the analogy questions reveal that the target contestant was the less intelligent contestant (and therefore that they need not interact with him in the future) than that the target was the more intelligent contestant. In contrast, subjects in the no-preference conditions, faced with a choice between two equally likable contestants, should have little or no preference for one contestant or the other to be more intelligent.

Performance Manipulation

The second variable manipulated was the performance quality of the two contestants on the analogy test questions. The 18 analogy questions were conceived of as three sets of 6 questions and within each of the three 6-question sets, two different performance patterns were constructed. In the positive performance pattern, the responses circled on the cards indicated that the contestant answered *5 out of every 6 questions correctly.* In the negative performance pattern, the contestant answered only *3 out of every 6 questions correctly.* In the *target-positive* conditions, the target contestant was seen to give the positive test performance and the comparison contestant the negative performance. In the *target-negative* conditions, on the other hand, the target contestant was seen to give the negative performance and the comparison contestant the positive performance.

Recall that one goal of this study was to "hold the judgment constant," that is, lead all subjects to make the same judgment while measuring how much information was required to make it. Thus, it was intended that the performance patterns in the current study be distinct enough such that subjects examining the cards would all be led to conclude that the contestant associated with the positive performance pattern was the most intelligent. This judgment pattern is critical if the amount of information required to make the judgments is to be compared across conditions and to rule out the possibility that subjects were simply choosing the individual they most wanted to work with as most intelligent. Thus, it was established at the outset that only those subjects choosing the contestant associated with the positive test performance as most intelligent would be considered in the primary analyses.

Design

Overall then, this study used a 2 (preference vs. no preference) × 2 (target-positive performance vs. target-negative performance) between-subjects design. Stated another way, combining the preference and performance manipulations created two preference conditions: (a) a *preference-consistent condition* in which the subject prefers that the dislikable target contestant perform poorly and he, in fact, performs poorly; (b) a *preference-inconsistent condition* in which the subject prefers that the dislikable target contestant perform poorly and he, in fact, performs well; and (c) two corresponding control/no-preference conditions: *one corresponding to the preference-consistent condition* (i.e., the likable target contestant performs poorly) and *one corresponding to the preference-inconsistent condition* (i.e., the likable target contestant performs well). The key dependent measure was the number of analogy question cards subjects required to make their decision regarding which contestant was most intelligent.

Controlling Intelligence Information

In this study, as in many other real-world and research situations, the judgmental consequences of differential expectations exactly mimic those of differential preferences (cf. Miller & Ross, 1975; Tetlock & Levi, 1982). Just as we predict that individuals will require more information to reach a preference-inconsistent conclusion than a preference-consistent conclusion, research has shown that individuals require more information to reach an expectancy-inconsistent conclusion than an expectancy-consistent one (e.g., Darley, Fleming, Hilton, & Swann, 1988).

We took several steps to control subjects' expectancies regarding the intelligence of the contestants and, in fact, to set them slightly against ourselves by conveying the image that the target contestant was slightly more intelligent than the comparison contestant. First, 21 female undergraduates rated 10 pictures of male students as to their perceived intelligence and likability. The picture rated highest in intelligence ($M = 8.05$ on a 9-point scale) was used as the target contestant. A second picture somewhat lower in perceived intelligence ($M = 7.19$) but comparable in perceived likability was chosen for use as the comparison contestant. Second, the target contestant was given a slightly higher high school GPA (3.0) than the comparison contestant (2.9). Third, the preference manipulation itself was designed to convey dislikability in a way that did not also convey a lack of intelligence. All partner evaluation forms indicated the same rating of the contestants' intelligence (7 on a 9-point scale). Also, the comments on the target contestant's evaluation form in the preference conditions conveyed the image of the target as a "know-it-all," thus suggesting high intelligence as much or more so than low intelligence.

Finally, a post hoc measure of subjects' expectations was included in the dependent measures in the form of subjects' self-reported surprise regarding which contestant turned out to be more intelligent. Thus, if we were successful at conveying the image that the target contestant was more intelligent than the comparison contestant, this should be revealed in relatively elevated surprise ratings in the target-negative conditions (i.e., when the target contestant performs more poorly than the comparison contestant).

Results

Preliminary Analyses and Manipulation Checks

Six subjects chose the contestant associated with the poor performance as most intelligent. All 6 of these subjects were in the preference, target-positive (i.e., preference-inconsistent) condition. Afterward, *t* tests comparing these 6 subjects with the 15 preference-inconsistent subjects choosing the target contestant as most intelligent were conducted on all dependent measures, and no significant differences were found. In addition, Preference (preference vs. no preference) × Performance (target positive vs. target negative) analyses of variance (ANOVAs) were conducted on all dependent measures both including and excluding these 6 subjects, and all results were identical. This suggests that the differential attrition rate across conditions does not pose interpretive problems for the current study and is perhaps best viewed as support for the effectiveness of the preference manipulation. Some subjects chose to ignore the intelligence evaluation task rather than to work with the dislikable target contestant.[1]

Additional support for the effectiveness of the preference manipulation comes from subjects' ratings of the likability and attractiveness of the target contestant. Preference × Performance ANOVAs revealed that the target contestant was rated as significantly less likable in the preference conditions ($M = 4.6$) than in the no-preference conditions ($M = 6.6$), $F(1, 56) = 29.80$, $p < .001$, and significantly less attractive in the preference conditions ($M = 3.8$) than in the no-preference conditions ($M = 5.0$), $F(1, 56) = 8.93$, $p < .01$. The only other significant effect in these two ANOVAs was that the target contestant was seen as significantly more likable when he performed well ($M = 6.0$) than when he performed poorly ($M = 5.2$), $F(1, 56) = 4.24$, $p < .05$. Ratings of the likability and attractiveness of the comparison contestant revealed no significant effects.

The performance manipulation was also successful. Subjects' ratings of the quality of the contestants' analogy test performances, the percentage of analogy questions answered correctly by both contestants, as well as their ratings of the intelligence and logical ability of both contestants all revealed only main effects for performance (all $ps < .001$), suggesting that whomever was associated with the positive performance was seen as performing better, more intelligent, and so forth.

Amount of Information Required to Make the Intelligence Decision

All subjects in the main analyses chose the contestant performing best on the analogy questions as most intelligent. The key dependent measure in this study, however, was the number of analogy questions required by subjects to make this decision. Overall, subjects in the no-preference conditions required significantly more cards to make their decision ($M = 9.3$) than did subjects in the preference conditions ($M = 7.8$), $F(1, 56) = 4.43$, $p < .05$. This main effect, however, was qualified by a significant Preference × Performance interaction, $F(1, 56) = 6.14$, $p < .02$, showing that, as predicted, the perceived likability of the target contestant affected the amount of information required by subjects to make their intelligence decisions. Figure 1 presents the mean number of analogy questions required to make the intelligence decisions across the four conditions. Simple effects analyses showed that in the no-preference conditions (i.e., when both contestants were equally likable), there was no difference in the number of cards required to decide that the target contestant was less intelligent (when he performed relatively poorly; $M = 9.9$) than that he was more intelligent (when he performed relatively well; $M = 8.8$), $F(1, 56) = 1.12$, $p = .29$. However, in the preference conditions (i.e., when the target was dislikable), subjects required significantly fewer cards to make the preference-consistent decision (i.e., decide that the dislikable target was less intelligent; $M = 6.6$) than to make the preference-inconsistent decision (i.e., decide that the dislikable target was more intelligent; $M = 9.1$), $F(1, 56) = 5.99$, $p < .02$.

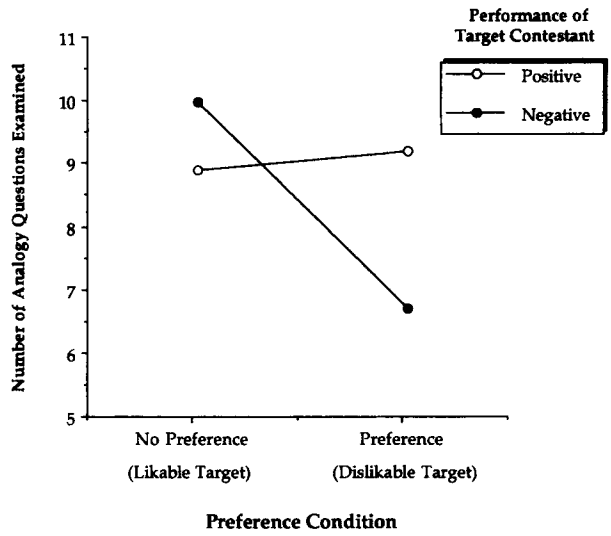

Figure 1. Number of analogy questions required for intelligence decision by experimental condition (Study 1).

Interestingly, simple effects analyses comparing the two target-positive and two target-negative conditions revealed that preference and no-preference subjects differed significantly from each other only in the target-negative cells, $F(1, 56) = 10.50$, $p < .01$. No other effects in the ANOVA were significant.

Self-Reported Surprise

Consistent with our intention of leading subjects to expect the target contestant to be somewhat more intelligent than the comparison contestant, subjects' self-reported surprise regarding which contestant turned out to be more intelligent revealed only a significant performance main effect, $F(1, 56) = 8.80$, $p < .01$. Subjects reported being more surprised when the target

[1] That these subjects ignored the intelligence evaluation task rather than the intelligence information is suggested by the fact that all 6 excluded subjects rated the target contestant as more intelligent than the comparison contestant. Thus, it was not that these subjects disregarded the incoming data and chose to believe what they wanted to believe but rather that they simply disregarded the assigned task and chose to interact with the contestant with whom they wanted to interact.

contestant performed relatively poorly (preference $M = 4.4$ and no-preference $M = 5.6$) than when the target contestant performed relatively well (preference $M = 3.9$ and no-preference $M = 3.4$).

Discussion

The results of Study 1 provide strong support for the hypothesis that individuals use differential decision criteria for preferred and nonpreferred judgment conclusions. Subjects presented with performance information suggesting that the dislikable contestant was less intelligent than his competitor required fewer analogy questions to make their decision than subjects presented with information suggesting that the dislikable contestant was the more intelligent of the two. A similar pattern did not emerge when the contestants were portrayed as equally likable. Thus, subjects' preference for the dislikable contestant to be less intelligent (and consequently to avoid additional contact with him) resulted in their requiring less information to arrive at this conclusion than to arrive at the less preferred conclusion.

Importantly, the results of Study 1 cannot be explained as a function of differential performance expectations regarding the two contestants. Subjects in both the preference and no-preference conditions reported being more surprised when the target contestant performed relatively poorly than when he performed relatively well. Although self-reported surprise after receiving information is by no means a perfect indicator of preinformational expectations, the most obvious interpretation of the surprise data is that subjects expected the target contestant to be more intelligent and thus reported a relatively high degree of surprise when the test performances suggested that he was not.

Finally, although the results of Study 1 provide clear support for the differential criteria prediction, stronger support was found for subjects' "freezing" their decision process relatively quickly when faced with preference-consistent information than for their persisting in their analysis when faced with preference-inconsistent information. In other words, the clearest effect in Study 1 is that subjects needed relatively few cards to decide that the dislikable contestant was the less intelligent contestant. No evidence was obtained that subjects faced with preference-inconsistent information required more information to make their judgment than no-preference subjects faced with the identical information.

The analysis of motivated reasoning presented here should not be misinterpreted as predicting that the source of "bias" in the processing of preference-relevant information resides exclusively in the hypercritical processing of preference-inconsistent information. The core of our analysis concerns the relative difference in the quantity of processing given to preference-consistent and preference-inconsistent information. In fact, the pattern of results found in Study 1 might be interpreted as consistent with past research showing better evidence for self-enhancement biases than self-protective biases (Miller & Ross, 1975). Self-enhancement biases involve the ready acceptance of preference-consistent information, whereas self-protective biases involve a reluctance to accept preference-inconsistent information. It is also consistent with a large body of research showing that subjects in positive moods tend to use less complete and effortful cognitive strategies than do subjects in more neutral moods (Bless et al., 1990; Isen, 1984; Mackie & Worth, 1989; Worth & Mackie, 1987). In this view, much of the bias in the perception of preference-relevant information may result not from a tendency to be hypercritical of preference-inconsistent information, but rather from a tendency to quickly and uncritically accept information with desirable implications.

Study 1 examined the differential decision criteria hypothesis within the context of an interpersonal judgment. Although there is little reason to make distinctions between intrapersonal and interpersonal judgments in terms of how preferences are likely to operate, most research on motivational biases examines judgments where the motivational power is generated by presenting individuals with information that is somehow threatening to their self-image. Study 2 examines the differential decision criteria prediction in this more traditional judgmental domain.

Study 2

There are perhaps few things more disturbing than discovering that one might be ill. Most people in most situations clearly prefer health to sickness (Ware & Young, 1979). This general preference is supported by a variety of experimental studies demonstrating "defensive" reactions of individuals confronted with unfavorable medical diagnoses (e.g., Croyle & Sande, 1988; Ditto et al., 1988; Jemmott, Ditto, & Croyle, 1986). These studies show that compared with individuals receiving a "healthy" diagnosis, individuals receiving an unhealthy diagnosis downplay the seriousness of the diagnosed disorder and its consequences, augment the perceived commoness of the diagnosed disorder and its consequences, and derogate the accuracy of the diagnostic test.

Study 2 takes advantage of this powerful preference by comparing subjects' reactions to information suggesting either health or illness. The general prediction is that given that people generally prefer health to illness, more information should be required for people to accept a seemingly unhealthy diagnosis than a seemingly healthy one.

Method

Subjects

Subjects were 51 undergraduates from general psychology courses at Kent State University who participated for course credit. The results from 3 subjects were discarded after participation because they voiced suspicions about the experimental manipulations. The final sample consisted of 48 subjects, 29 women and 19 men.

Procedure

The experimental procedure used in this study has been described in detail elsewhere (see Croyle & Ditto, 1990, for a lengthy discussion of its development and validation). It is described here with an emphasis on those aspects of the procedure that are unique to this study.

On arrival at the laboratory suite, subjects were told that the study was concerned with "the relationship between psychological characteristics and physical health" and would consist of them completing

some health and personality questionnaires and taking some simple medical tests. An experimenter then measured subjects' blood pressures and gave them a packet of "personality questionnaires" to complete. This packet contained a 14-item hypochondriasis scale (Pilowsky, 1967). Three subjects answered 8 or more questions in the hypochondriacal direction. These subjects were told that they were in a control condition, given their full experimental participation credit, and excused.

After completing the questionnaires, the experimenter read a description of a fictitious medical condition called "TAA deficiency" in which an enzyme called thioamine acetylase (TAA) is absent from the body. TAA deficiency was said to cause individuals who have it to be "relatively susceptible to a variety of pancreatic disorders" later in life.

The experimenter went on to state that about 6 months ago a chemically coated test paper was developed that reacts to the presence of TAA in saliva. Subjects assigned to the *deficiency condition,* were told that if TAA reactive paper comes in contact with saliva in which TAA is absent (indicating TAA deficiency) it will show *no color reaction,* but if it comes in contact with saliva containing TAA, it would change from its *normal yellow color to a dark green.* Subjects assigned to the *no-deficiency condition,* on the other hand, were told just the opposite. These subjects were told that the TAA paper would change from yellow to green if TAA was absent in saliva but show no color reaction if TAA was present.

Subjects were then told how to self-administer the test. Subjects were told to place a small amount of saliva in a cup and to rub a strip of the test paper in their saliva. Color development in the moistened test strip was said to "take anywhere from 10 seconds to one minute but is generally complete within 20 seconds." As soon as their test result was clear, subjects were told that it was important for them to "as quickly as possible" place their test strip in a small envelope to "provide us with a permanent record of your test result."

After the experimenter checked to make sure all subjects understood the testing procedures, subjects were left alone to conduct the test and told to complete the next packet of questionnaires (containing the dependent measures described later) as soon as the test was completed.

When subjects administered their TAA saliva reaction test, the test strip (made of yellow construction paper) always remained yellow. Because of what they had previously been told about the nature of the test, however, deficiency subjects interpreted this lack of reaction as an indication that they *had TAA deficiency,* whereas no-deficiency subjects interpreted it as indicating that they *did not have TAA deficiency.*

Dependent Measures

Measures of "defensiveness." Subjects completed a packet of questionnaires asking them to indicate their beliefs about a series of different health disorders. There were five key dependent measures embedded in the questionnaire packet: subjects' ratings of the *seriousness of TAA deficiency and pancreatic disease* on a scale from 0 (*not serious/can be ignored*) to 100 (*very serious/life threatening*), subjects' percentage estimates of the *prevalence of TAA deficiency and pancreatic disease* in the college-age population, and subjects' ratings of the *accuracy of the TAA saliva reaction test* on a 9-point scale (1 = *extremely inaccurate* and 9 = *extremely accurate*).

Coded videotape measures. Subjects' behavior was surreptitiously videotaped during the experimental session. The raw videotapes were edited to remove all indications of assigned condition, and these segments were viewed by two judges. The judges' key task was to record the amount of time each subject required to decide that his or her TAA test was complete, that is, that no color reaction was going to take place. Behavioral markers were built into the TAA test to facilitate this judgment. Judges were told that the subjects' decision process would be framed on one side by the dipping of the test strip in the saliva and on the other by the sealing of the test strip in the provided envelope. The judges were able to reliably make this judgment (Spearman-Brown coefficient = .85), and so the two judges' times were averaged to form a decision latency index. The judges were also asked to make a note of all subjects engaging in multiple testing of their saliva sample (e.g., redipping the test strip in the saliva after observing the initial result). Judges showed very high agreement on these judgments, disagreeing in only two instances (96% agreement rate). Only those behaviors on which both judges agreed were considered.

Debriefing

On completion of the dependent measures, subjects were put through a careful process debriefing (Ross, Lepper, & Hubbard, 1975). Subjects indicated little if any distress regarding the procedure during the debriefing.

Results

Test Result (deficiency vs. no deficiency) × Gender (male vs. female) ANOVAs on all dependent measures revealed no main effects or interactions involving gender. Thus, unless otherwise noted, all analyses reported are independent t tests comparing the deficiency and no-deficiency groups.

Defensiveness Measures

Consistent with past research using this paradigm, subjects confronted with the unfavorable diagnostic information showed relatively optimistic assessments of the meaning of their test result. As can be seen in Table 1, deficiency subjects perceived TAA deficiency as less serious, $t(45) = -3.80$, $p < .01$, and more common, $t(44) = 4.53$, $p < .01$, than did no-deficiency subjects; pancreatic disease as less serious, $t(43) = -1.98$, $p < .05$, and more common, $t(43) = 2.86$, $p < .01$, than did no-deficiency subjects; and the TAA saliva reaction test as a less accurate indicator of TAA status, $t(45) = -2.43$, $p < .05$, than did no-deficiency subjects.[2]

Coded Videotape Measures

The key dependent measure in the current study was the amount of time subjects required to decide that their TAA saliva reaction test was complete. Quite consistent with the deficiency subjects' posttest indications of defensiveness, inspection of the videotape records revealed evidence of deficiency subjects' reluctance to accept their unfavorable diagnosis. Deficiency subjects took almost 30 s longer on average to decide that their TAA test was complete ($M = 104.8$ s) than did no-deficiency subjects ($M = 76.5$ s), $t(45) = 2.60$, $p < .02$.

One possible explanation of this decision latency difference is that deficiency subjects were simply stunned by the unfavorable diagnosis and thus that this extra decision time was characterized by a relatively passive disbelief rather than by a vigorous analysis of preference-inconsistent information. This explanation is undermined, however, by evidence suggesting that sub-

[2] The differential degrees of freedom reported are due to missing values for some measures.

Table 1
Condition Means for All Dependent Measures (Study 2)

Measures	Diagnosis condition	
	Deficiency	No deficiency
Posttest		
Seriousness of TAA deficiency	31.7	49.8
Seriousness of pancreatic disease	54.8	67.3
Prevalence of TAA deficiency	38.8	16.6
Prevalence of pancreatic disease	23.0	13.1
Accuracy of TAA saliva test	4.9	6.2
Videotape		
Decision latency (in seconds)	104.8	75.5
No. of subjects' multiple testing	13 (52%)	4 (18%)

Note. Seriousness judgments were made on a scale from 0 (*not at all serious/can be ignored*) to 100 (*very serious/life threatening*). Prevalence judgments represent the percentage of the college-age population estimated to have had each disorder. Accuracy judgments were made on a scale from 1 (*extremely inaccurate*) to 9 (*extremely accurate*). TAA = thioamine acetylase (fictitious medical condition).

jects faced with the unfavorable diagnosis actively engaged in a variety of behaviors designed to test and retest the validity of their test result. The bottom row of Table 1 shows the number of subjects in each condition who, after initial examination of their test result (i.e., no color change), retested themselves. Thirteen of 25 deficiency subjects (52%) engaged in some sort of retesting behavior as opposed to only 4 of 22 no-deficiency subjects (18%), $\chi^2(1, N = 47) = 5.79$, $p < .05$.[3]

The most common form of retesting observed was a simple redipping of the original test strip in the original saliva sample after observing the initial lack of color reaction. All 4 of the no-deficiency subjects displayed this simple redipping behavior. Deficiency subjects, however, often went to much greater lengths to examine the validity of their test result. Three subjects conducted a second test with a new test strip (1 of whom placed the second strip in her shirt pocket—perhaps for later examination). Four tested a second saliva sample. Others engaged in a variety of different testing behaviors, such as placing the test strip directly on their tongue, multiple redipping of the original test strip (up to 12 times), as well as shaking, wiping, blowing on, and in general quite carefully scrutinizing the recalcitrant nature of their yellow test strip.

Discussion

Study 2 provides support for the differential decision criteria hypothesis in a second domain and with a second operationalization of information quantity. Presented with an unchanging yellow test strip, subjects believing this lack of color change to be an indication of an enzyme deficiency required more time to decide that no color reaction was going to take place than did subjects believing this lack of color change to be an indication of normal enzyme presence. This extra time was not spent idly. Deficiency subjects were also more likely than no-deficiency subjects to conduct replications of the original test to check on its validity. This can be seen as an experimental analog of the *anecdote in the introduction* to this article. When unsatisfied with an initial diagnosis, individuals tend to "seek a second opinion." Interestingly, both common sense and the results of Study 2 suggest that people are more likely to consult a second opinion when faced with an unfavorable diagnosis than with a favorable one.

The results of Study 2 are consistent with both those of Study 1 and with our major prediction. Whether the unwanted outcome is illness or the prospect of an unpleasant social interaction, whether amount of information is defined as a decision latency or as the number of analogy questions examined, less information seems required to reach a preferred conclusion than a nonpreferred one. In addition, Study 2 provides some direct evidence that preference-inconsistent information is more likely to be carefully scrutinized than preference-consistent information.

Study 2, unfortunately, is ultimately vulnerable to amotivational counterexplanations. At the most general level, it might be argued that subjects in Study 2 required more time to accept the unhealthy diagnosis than the healthy one not because the unhealthy diagnosis was unwanted but simply because it was unexpected. Enthusiasm for this and related counterexplanations should be tempered by the fact that previous research using the same experimental paradigm has provided data difficult to explain from a purely informational standpoint (see Croyle & Ditto, 1990, and Ditto et al., 1988, for more detailed discussions). Nevertheless, one of the goals of Study 3 was to provide additional evidence against expectancy-based counterexplanations.

The second and more central goal of Study 3, however, was to provide more direct evidence for the notion that individuals are more likely to generate alternative explanations for preference-inconsistent than preference-consistent information. Although data exist to suggest that preference-inconsistent information receives more processing than preference-consistent information, no direct evidence supports Kruglanski's (1990) idea that this additional processing includes a greater consideration of alternative explanations. The link between any such differential processing and judgment outcomes has also yet to be empirically demonstrated.

Study 3

As in Study 2, subjects in Study 3 were presented with diagnostic information regarding the TAA enzyme condition. The primary dependent measure in Study 3 was subjects' generation of possible alternative explanations for their diagnostic test result. Elaborating on a measure used by Ditto et al. (1988), subjects were asked to list any recent irregularities in their lives that they believed might have affected the accuracy of their test result. Subjects' beliefs about the overall accuracy of the diagnostic test were also measured.

Study 3 attempted to disentangle expectancy-based and motivational explanations for the results of Study 2. The design flaw in Study 2 is that sickness is statistically less common than health, leading to a confound between preference consistency

[3] Because of equipment failure, 1 no-deficiency subject was not videotaped.

and expectancy consistency (deficiency feedback being both preference inconsistent and expectancy inconsistent). Study 3 avoided this problem by leading all subjects to believe they had a relatively rare enzyme condition but manipulating the perceived healthfulness of the condition (e.g., Ditto & Jemmott, 1989). That is, subjects were presented with diagnostic outcomes that were equally unexpected and differed only in terms of their consistency with subjects' preferences.

Study 3 also included two control groups designed to be similar to the no-preference groups in Study 1. As in Study 2, the key groups in Study 3 evaluated the diagnostic information after receiving their diagnosis. Study 3 included another set of subjects who evaluated the diagnostic information after the diagnostic test was described but *before* receiving their diagnostic results. These subjects should lack the motivation hypothesized to drive any differential consideration of the validity of the diagnostic test. The inclusion of a prediagnosis judgment group also provided a convenient way of checking on subjects' expectations regarding the likelihood of receiving the different kinds of diagnoses.

Method

Subjects

Subjects were 93 undergraduates from general psychology courses at Kent State University who participated for course credit. The results from 3 subjects were discarded after participation because they voiced suspicions about the experimental manipulations. The results from 3 others were discarded because of procedural errors made during the course of the experiment. The participation of 8 additional subjects was terminated after each exceeded our hypochondriasis screening cutoff. The final sample consisted of 79 subjects, 49 women and 30 men.

Procedure and Manipulations

Two small procedural changes were made to facilitate the current cover story and manipulations. First, the TAA enzyme condition in Study 3 was described as the presence of the TAA enzyme ("TAA positivity") rather than its absence ("TAA deficiency"; Ditto & Jemmott, 1989). Second, all subjects were led to believe that they had this condition by telling them that if the TAA enzyme was present in their saliva their test strip would turn from yellow to green and rigging their test paper to show this color reaction.[4] These changes were incorporated to present subjects with the simplest possible cover story—presence of the enzyme being indicated by presence of the color reaction.

The valence manipulation. The desirability of TAA positivity was manipulated by leading some subjects to believe that TAA positivity had *unhealthy consequences* (e.g., "people who are TAA positive are 10 times more likely to experience pancreatic disease than are people whose secretory fluids do not contain TAA.") and others to believe that it had *healthy consequences* (e.g., "people who are TAA positive are 10 times less likely to experience pancreatic disease than are people whose secretory fluids do not contain TAA.") To control subjects' expectations about the likelihood of being TAA positive, all subjects were given identical base-rate information stating that preliminary research indicated that TAA positivity was found in "about *1 out of every 20 people (5%)*" (emphasis in original).

Timing of dependent measures. Half of the subjects completed the dependent measure packet immediately after the TAA saliva test was described but before taking the test and receiving their test result (*prediagnosis conditions*). The other half of the subjects completed the dependent measures immediately after self-administering the TAA saliva reaction test and receiving their test result (*postdiagnosis conditions*).

Dependent Measures

Subjects in the prediagnosis and postdiagnosis conditions completed slightly different versions of the dependent measures. The items completed by all subjects are described first, followed by those completed by the prediagnosis and postdiagnosis subjects only.

All subjects. The first question included the statement "the accuracy of diagnostic tests can be affected by person-specific factors such as irregularities in diet, stress, sleep pattern, or activity level." Subjects were then asked to write down in a provided space "any such irregularities that have been true for you during the last 48 hours that might affect the accuracy of your TAA test result." The number of test-affecting life irregularities listed by each subject was summed. All subjects also rated (a) the *clarity of the experimenter's explanation* of the testing procedures on a 9-point scale (1 = *very unclear/difficult to understand* and 9 = *very clear/easy to understand*) and (b) their opinion regarding the *overall accuracy of the TAA saliva reaction test* on a 9-point scale (1 = *very inaccurate* and 9 = *very accurate*).

Prediagnosis subjects only. Two additional items were included in prediagnosis subjects' dependent measure packets. First, subjects were asked to indicate whether there was anything in their personal or family medical history that "makes you think that you may have TAA positivity?" If so, subjects were asked to explain. Second, subjects were asked to estimate their *overall likelihood of being TAA positive* on a 9-point scale (1 = *very unlikely* and 9 = *very likely*).

Posttest subjects only. In addition to being asked to note any life irregularities that might have affected their test, postdiagnosis subjects were asked to write down any problems they had administering the TAA saliva reaction test that they thought might have affected the accuracy of their test result. The number of problems listed by each subject was summed.

On completion of the dependent measures, subjects were put through a careful process debriefing, thanked, and dismissed. Subjects indicated little if any distress regarding the procedure during the debriefing.

Results

Condition Valence (healthy vs. unhealthy) × Timing of Dependent Measures (prediagnosis vs. post-diagnosis) × Gender (male vs. female) between-subjects ANOVAs revealed no main effects or interactions involving gender on any dependent measure. Thus, unless otherwise noted all analyses reported are Condition Valence × Timing of Dependent Measures ANOVAs.

Perceived Likelihood of TAA Positivity

No prediagnosis subject indicated anything in their personal or family history that made them think they might be TAA positive. Subjects told that TAA positivity had desirable health consequences did not differ in their perceived likelihood of

[4] The color reaction is created by using glucose-sensitive paper as the TAA test paper and spiking subjects' mouthwash with a small amount of sugar (e.g., Jemmott, Ditto, & Croyle, 1986).

being TAA positive ($M = 3.3$) from subjects told that TAA positivity had undesirable health consequences ($M = 3.1$), $F < 1$.

Generation of Alternative Explanations

No differences were found in subjects' ratings of the clarity of the experimenter's explanation of the testing procedures. Subjects uniformly rated the experimenter's explanation as very clear (overall $M = 8.3$ on a 9-point scale). Similarly, only 4 out of 40 postdiagnosis subjects listed problems with administering the test as possibly affecting their test result, and only 1 cited more than one. All 4 of these subjects were in the unhealthy diagnosis condition.

Subjects who believed TAA positivity to be unhealthy cited more test-affecting life irregularities ($M = 1.4$) than did subjects who believed TAA positivity to be healthy ($M = .9$), $F(1, 75) = 5.56$, $p < .05$. This main effect, however, was qualified by a significant Valence × Timing interaction, $F(1, 75) = 7.50$, $p < .01$, showing that, as predicted, this healthy–unhealthy difference was limited to the postdiagnosis conditions. Figure 2 presents the mean number of test-affecting life irregularities cited across the four experimental conditions. Simple effects analyses showed that in the prediagnosis conditions there was no difference in the number of life irregularities cited by subjects in the healthy ($M = 1.3$) and unhealthy conditions ($M = 1.2$), $F < 1$. In the postdiagnosis conditions, however, subjects given the unhealthy diagnosis cited significantly more life irregularities that could have affected the results of their test ($M = 1.7$) than did subjects given the healthy diagnosis ($M = .5$), $F(1, 75) = 13.16$, $p < .01$.

Simple effects analyses comparing the two healthy and two unhealthy conditions revealed that the difference between the two healthy conditions was somewhat more reliable, $F(1, 75) = 5.14$, $p < .05$, than that between the two unhealthy conditions, $F(1, 75) = 2.59$, $p < .12$. No other effects in the ANOVA were significant.

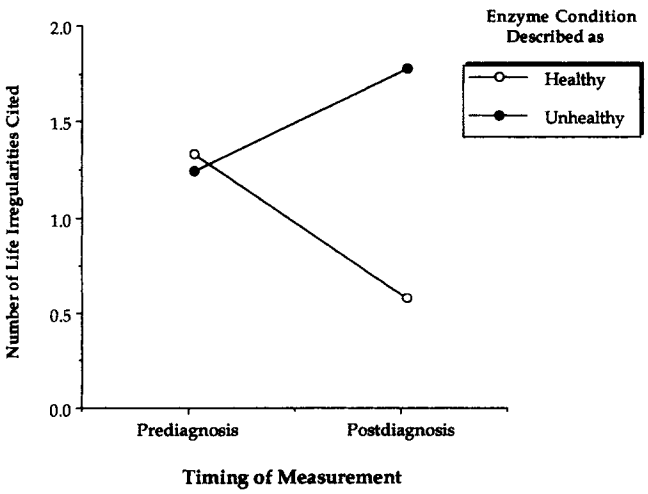

Figure 2. Number of test-affecting life irregularities cited by experimental condition (Study 3).

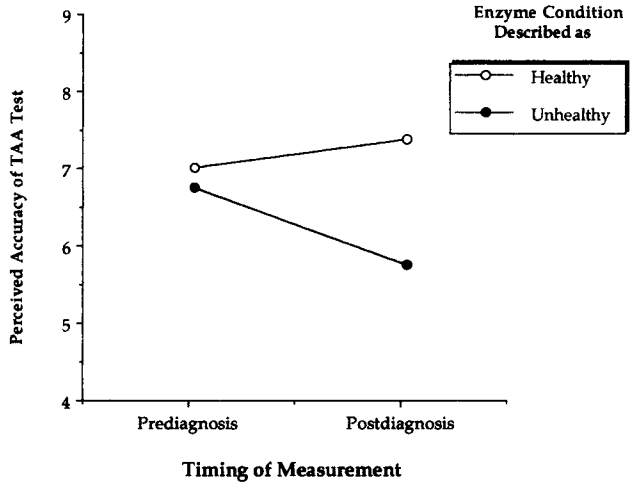

Figure 3. Perceived accuracy of thioamine acetylase (TAA, a fictitious medical condition) saliva reaction test by experimental condition (Study 3).

Perceived Accuracy of the TAA Saliva Reaction Test

Subjects' ratings of the accuracy of the TAA saliva reaction test were very consistent with the life-irregularity citings. Overall, subjects who believed TAA positivity to be unhealthy rated the TAA test as less accurate ($M = 6.1$) than did subjects who believed TAA positivity to be healthy ($M = 7.1$), $F(1, 73) = 7.74$, $p < .01$. This main effect, however, was qualified by a significant Valence × Timing interaction, $F(1, 73) = 4.01$, $p < .05$, showing that this healthy–unhealthy difference was again limited to the postdiagnosis conditions. Figure 3 presents the mean accuracy ratings across the four experimental conditions. Simple effects analyses showed that in the prediagnosis conditions there was no difference in the perceived accuracy of the TAA test in the healthy ($M = 6.9$) and unhealthy conditions ($M = 6.6$), $F < 1$. In the postdiagnosis conditions, on the other hand, subjects given the unhealthy diagnosis rated the diagnostic test as significantly less accurate ($M = 5.6$) than did subjects given the healthy diagnosis ($M = 7.3$), $F(1, 73) = 11.31$, $p < .01$.

In contrast with the same analyses on life-irregularity citings, simple effects analyses comparing the accuracy ratings of the two healthy and two unhealthy conditions revealed that the difference between the two healthy conditions was less reliable ($F < 1$) than that between the two unhealthy conditions, $F(1, 73) = 4.25$, $p < .05$. No other effects in the ANOVA were significant.

Finally, the correlation between the number of life irregularities cited and perceived accuracy of the TAA saliva reaction test was negative and significant ($r = -.42$, $p < .0001$). The more life irregularities subjects generated, the less accurate they perceived the TAA diagnostic test to be. The within-cell correlations were as follows: prediagnosis, healthy ($r = -.37$); prediagnosis, unhealthy ($r = -.37$); postdiagnosis, healthy ($r = -.06$); and postdiagnosis, unhealthy ($r = -.38$).

Discussion

The results of Study 3 provide additional evidence that people are less critical consumers of preference-consistent than preference-inconsistent information. Consistent with the predictions of Kruglanski (1990), subjects generated fewer alternative explanations for a diagnostic test result indicating a healthy medical condition than for one indicating an unhealthy medical condition. This occurred even though subjects asked before receiving their diagnosis rated the healthy and unhealthy diagnoses as equally unexpected. The fact that prediagnosis subjects did not show an assymetry in the number of life irregularities cited also attests to the motivated nature of the obtained results.

Consistent with past research (e.g., Ditto et al., 1988), postdiagnosis subjects rated the unhealthy diagnosis as less accurate than the healthy diagnosis. That these differential accuracy ratings are a product of a difference in how vigorously alternative explanations for the diagnosis were considered is suggested by the negative correlation between the number of life irregularities cited and overall accuracy ratings. The causal direction of this relation is, of course, ambiguous. It is possible that subjects simply decided how accurate they wanted the test to be and then provided the number of life irregularities that would justify that position. It is important to note, however, that the correlation is just as evident in the prediagnosis conditions, where subjects have no decision to justify, as it is in the postdiagnosis conditions, where they do. The only cell where the negative correlation does not emerge is in the postdiagnosis, healthy condition probably because both the life irregularities and test accuracy measures have relatively small variances in that cell. Thus, the results of Study 3 are consistent with the mediational role of processing intensity in differential validity perceptions; however, future research needs to provide more conclusive evidence.

The fact that no effects were found on measures related to the quality of the experimenter's test instructions and only a very few subjects cited problems with the test's administration is consistent with the general notion that the effect of preferences on information processing and judgments is constrained, ultimately, by the clarity of the information itself. As concerned researchers, we took great pains to train our experimenters to give clear instructions and to devise compelling manipulations and cover stories. That subjects overwhelmingly rated the experimenter's instructions as clear and had few problems following those clear instructions to complete a simple test suggests that we may have left even motivated subjects with little room to find fault with these aspects of the diagnosis. The informational panorama presented by 48 hr of a college student's life, on the other hand, is likely to have provided much more grist for a motivated cognitive mill. Motivational factors do not operate in a cognitive vacuum. The predicted effects likely reveal themselves most strongly on the life-irregularity measure because this measure provided subjects with a more fertile ground of plausible alternative explanations for the test result than the other measures (see Dunning, Meyerowitz, & Holtzberg, 1989, for a similar result).

Like the analogous results of Study 1, the simple effects comparing the life-irregularity citings of the two healthy conditions are more reliable than those comparing the two unhealthy conditions. The opposite pattern of simple effects, however, is found in subjects' perceived accuracy ratings. For both the life-irregularity and perceived accuracy findings, it seems plausible that the specific pattern of simple effects observed is a function of differential ceiling effects in particular conditions. The number of life irregularities cited by postdiagnosis, unhealthy subjects may have been mitigated by subjects' inability to plausibly generate more than a few such irregularities (or perhaps their reluctance to report more than a few because of self-presentational concerns). Similarly, the accuracy ratings of postdiagnosis, healthy subjects were likely constrained by the fact that accuracy ratings were quite high overall (see Figure 3), and thus, these subjects had relatively little room to adjust their accuracy ratings upward.

Perhaps the best interpretation of the results from Study 3 is that the effects appear relatively symmetrical for preference-consistent and preference-inconsistent information. This type of symmetrical pattern would again be quite consistent with the larger body of research on the role of affect in information processing. This literature suggests both that positive affect results in relatively truncated processing compared with more neutral moods (Mackie & Worth, 1989) and that negative affect results in more intensive processing compared with neutral moods (Schwarz, 1991).

From this perspective, the different pattern of results found in Study 1 and Study 3 may be attributable to differences in the affective responses subjects had to the information provided in the two studies. The information provided subjects in Study 3 would be expected to produce relatively symmetrical affective responses. Subjects told they had a rare and beneficial enzyme condition should have experienced positive affect; those told they had a rare and unhealthy enzyme condition should have experienced negative affect. Relatively symmetrical processing effects would, in turn, be expected. The preference-inconsistent condition in Study 1, however, may have produced relatively little negative affect. Although subjects clearly preferred not to work with the dislikable contestant, they did not report an intense dread of this possibility. If they also went into the intelligence evaluation task expecting to work with the dislikable contestant (given the information about his higher intelligence), then the discovery that the expected was in fact true may have produced relatively little negative affect (Feather, 1969). In contrast, subjects discovering that the dislikable contestant was less intelligent may have found this information an unexpected, and therefore relatively pleasant, surprise. The asymmetrical decision criteria effects would follow directly from these asymmetrical affective consequences.

General Discussion

The question facing new look researchers in the early 1950s and self-serving bias researchers in the early 1980s was *whether* motivational factors could be shown to affect judgments. Now that the case for motivated biases in judgment seems rather well made (Kunda, 1990), the pressing issue of the early 1990s concerns the careful specification of exactly *how* motivational fac-

tors enter into and affect judgment processes. From early research within the cognitive dissonance (Festinger, 1957) and fear and persuasion (Janis & Feshbach, 1953) frameworks to several recent theoretical treatments of motivated judgment (Kruglanski, 1990; Kunda, 1990; Pyszczynski & Greenberg, 1987), many conceptualizations of the mechanisms underlying motivated reasoning have been suggested. Although these conceptualizations are clearly more complementary than antagonistic, important differences in emphasis exist that make some comparison between the views valuable in highlighting issues to be addressed in future research.

Motivated Skepticism and Selective Exposure

Our contention that more attention and thought is allocated to preference-inconsistent than preference-consistent information may initially seem incompatible with research within the selective exposure tradition (Festinger, 1957) showing that individuals will sometimes preferentially expose themselves to preference-consistent (i.e., "consonant") information over preference-inconsistent (i.e., "dissonant") information. Pyszczynski, Greenberg, and LaPrelle (1985), for example, found that subjects receiving negative feedback on a social sensitivity test indicated greater interest in social comparison information when they expected that information to show others to perform poorly compared with themselves than when they expected that information to show others performing relatively well (see also Frey & Stahlberg, 1986).

Quite the contrary, however, the idea that attention is initially directed toward preference-inconsistent information is perfectly compatible with recent research regarding the circumscribed nature of selective exposure effects. In his review of over 3 decades of research, Frey (1986) presented an image of selective exposure moderated by adaptive concerns. Initially, according to Frey, individuals direct attention toward unwanted information in an attempt to refute it (Wyer & Frey, 1983). As several researchers have argued, it makes adaptive sense that negative social information should be particularly likely to draw attention and careful, detail-oriented cognitive analysis (Pratto & John, 1991; Schwarz, 1991). This tendency to be at least equally interested in preference-inconsistent information as in preference-consistent information persists as long as the preference-inconsistent information is perceived to be refutable (Frey, 1981a) or the decision itself is perceived to be reversible (Frey, 1981b). In the Frey and Stahlberg (1986) study cited earlier, for example, subjects led to believe that an unflattering intelligence test result might be invalid were quite evenhanded in their interest in information they expected to disparage the test's validity and information they expected to support it.

Frey's (1986) analysis suggests that the tendency to preferentially expose oneself to information consonant with a desired judgment outcome is most likely to emerge relatively late in the decision process, when initial processing suggests that alternative explanations for preference-inconsistent information can no longer be plausibly entertained (see Jones & Gerard's, 1967, discussion of the "basic antinomy"). Thus, although selective inattention to threatening information was one of the first mechanisms posited to underlie defensive judgments (Janis & Feshbach, 1953; Janis & Terwilliger, 1962), there is neither empirical nor theoretical support for the notion that the tendency to perceive preference-inconsistent information as less valid than preference-consistent information is mediated by selective inattention to the former. Reluctance to acknowledge the validity of preference-inconsistent information seems to stem from its tendency to receive more rather than less attention than preference-consistent information.

The current research is fundamentally concerned with this initial process of validity assessment. Motivational forces, however, do not cease to operate once the validity of preference-relevant information has been tentatively accepted (Frey, 1986). It is at this point, for example, that selective exposure effects should become evident. Once the validity of preference-inconsistent information has been accepted, further exposure to validity-supporting information should no longer be perceived to be useful, although the individual should still be interested in seeing information undermining that validity. Individuals who have accepted the validity of preference-consistent information may also become relatively uninterested in information that would lead them to reassess that conclusion, particularly if they have behaviorally committed to this interpretation (Frey, 1986).

It is also the case that even though an individual may accept the validity of preference-inconsistent information, he or she may still engage in processes that soften its implications, such as downplaying the relevance of the aspect of self to which the information pertains (Tesser & Paulhus, 1983) or engaging in compensatory enhancement of some other aspect of self (e.g., Steele, 1988). Seeking self-enhancing social comparison information (Pyszczynski, Greenberg, & LaPrelle, 1985; Wills, 1981) is also best construed as softening the implications of threatening information rather than challenging its validity. Many writers have made a distinction between *denial of fact* (i.e., denying the validity of a threatening piece of information) and *denial of implication* (i.e., accepting the validity of the information but denying its threatening implications; Janis, 1958; Lazarus, 1983; Weisman, 1972), most suggesting that individuals attempt the first before resorting to the second. This is quite consistent with the available data. Confronted with unwanted information, the first "line of defense" seems to be a relatively thorough analysis of its validity. It is only if this initial analysis suggests that the validity of the information must be accepted, that the individual begins to direct attention away from additional information that might confirm that validity and toward a careful consideration of the implications of this information within the context of the broader social and self-systems.

The Quality Versus Quantity of Processing Distinction

Another point on which various conceptualizations of motivated reasoning differ concerns whether the processing of preference-consistent and preference-inconsistent information is thought to differ in quality or merely in quantity (e.g., Kunda, 1990). The current analysis and Kruglanski's (1980, 1990) theory of lay epistemology emphasize the quantitative nature of this difference, suggesting that the central way that motivational factors affect judgments is through their effects on how extensively preferred and nonpreferred information is analyzed. Kunda (1990), on the other hand, argued explicitly that

the processing of preference-consistent and preference-inconsistent information differs not simply in degree but also in kind. Like Pyszczynski and Greenberg (1987), Kunda's work relies heavily on a hypothesis-testing model of inference processes and argues that different hypotheses are generated for testing in response to preference-consistent and preference-inconsistent information, and different inference rules are used to evaluate these hypotheses.

A quantitative perspective is consistent with a hypothesis-testing conceptualization of inference processes. The theory of lay epistemology, in particular, is quite explicitly couched in hypothesis-testing language. In addition, a quantitative perspective would not dispute the fact that motivational factors may result in different hypotheses or inference rules being considered in response to preference-consistent and preference-inconsistent information. Where the quantitative and qualitative perspectives do differ, however, is in whether these differences are thought to occur directly as a function of motivational factors or indirectly as a function of the quantitative processing differences caused by motivational factors.

According to Kunda (1990), individuals "directly" access those beliefs and strategies that they consider "most likely to yield the desired conclusion" (p. 480). The quantitative view, on the other hand, would conceive of any such differences as arising only indirectly as a product of the relatively greater processing given to preference-inconsistent information. That is, an individual may very well be more likely to test the hypothesis that a diagnostic test is inaccurate when it yields a seemingly unfavorable result than when it yields a seemingly favorable one. However, this difference may not occur directly but rather because the initial characterization of the favorable diagnosis as accurate is readily accepted, whereas the negative affect generated by the initial characterization of the unfavorable diagnosis as accurate is likely to motivate the more effortful cognitive process of considering other possible attributional influences.

This description is quite consistent with the view of mental systems posited by Gilbert (1991), in which the provisional acceptance of information is thought to occur relatively effortlessly as part and parcel of the comprehension process, whereas the process of "unaccepting" information is thought to be more effortful. It is also consistent with Pyszczynski and Greenberg's (1987) statement that before any motive can create the affect necessary to influence the choice of hypotheses for testing (or indeed any other aspect of information processing), the individual must consider the possibility, however fleetingly, that the undesirable hypothesis is true (see also Spence, 1983). In the quantitative view then, the same initial hypotheses are considered in response to both preference-consistent and preference-inconsistent information; that is, there is no direct or qualitative difference in the initial hypothesis chosen for testing. The difference in the hypotheses ultimately "tested" in response to preference-consistent and preference-inconsistent information arises only as an indirect product of a quantitative difference in processing; that is, because more hypotheses are considered in the latter case than in the former. A similar reasoning follows for any differences in the inference rules used for testing those hypotheses.

One implication of conceiving of motivational bias from a quantitative rather than qualitative perspective is the relative lack of self-deception implied by the former. Although the general concept of self-deception is no longer the theoretical and empirical "bugaboo" it once was (Erdelyi, 1974; Sackheim & Gur, 1978), in one form or another the issue of self-deception has dogged research on motivated judgment since the 1950s (Fingarette, 1969; Howie, 1952; Luchins, 1950). The very concept of motivated inference necessitates that the undesirable nature of incoming information be represented at some level by the cognitive system. If the negative nature of the information is subsequently diminished somehow by that cognitive system, to what degree is the individual aware of how (or even that) this process has taken place?

The direct effects implied by qualitative models of motivated inference suggest that the individual must at some level "know" what an inference strategy will yield before choosing to use it. Without knowledge regarding which strategies are likely to yield the desired conclusion and which are likely to yield a less desirable one, it is impossible for an individual to opt for one and forgo the other. In the qualitative view then, people are conceived of as having different goals when considering preference-consistent and preference-inconsistent information, consequently choosing different inference strategies in the two cases based on their expectation regarding the answer that inference strategy is likely to produce vis-á-vis that goal.

The quantitative view, on the other hand, conceives of the difference between the processing of preference-consistent and preference-inconsistent information more as a difference in *drive* than a difference in goals. Individuals faced with preference-consistent information are conceived of as simply less motivated to critically analyze the available data than are individuals faced with preference-inconsistent information and, consequently, are less likely to consider multiple possible explanations for it. No need for individuals to knowingly opt for one hypothesis or inference rule over another is implied. In a sense, the quantitative view sees the goal of the cognitive process as the same in both instances—people are attempting to construct an accurate view of themselves and their world—it is the vigor with which that goal is pursued in the two situations that differs.

This is not to say, of course, that motivated inference strategies are never informed and shaped by expectations. Research on the self-enhancing nature of social comparison seeking strategies (e.g., Pyszczynski, Greenberg, & LaPrelle, 1985), for example, clearly shows that they are. What we are suggesting, rather, is that much of the biasing effect that preferences have may occur without the deliberate construction process inherent in the qualitative perspective. In a sense, the current analysis simply relocates some portion of motivational bias effects by suggesting that rather than exclusively affecting how preference-relevant information is processed, preferences may have much of their effect before this point by affecting whether (or perhaps more accurately, how deeply) such information is processed. Thus, rather than always having to assume a deliberate and necessarily self-deceptive construction process, wants and fears may often bias judgments more passively because of the simple fact that preference-consistent information is accepted "at face value," whereas preference-inconsistent information tends to trigger more extensive cognitive analysis.

Conclusions

Perhaps the most resonant finding in the last 2 decades of social cognition research is that people think more deeply about information in some situations than in others (Bargh, 1984; Chaiken et al., 1989; Isen, 1984; Petty & Cacioppo, 1986; Tetlock, 1983, 1985). The research presented here is an attempt to integrate theory and research on self-serving biases in judgment with this large body of research emphasizing the selective allocation of cognitive resources.

The view of self-serving bias presented here also serves to integrate this research with that on other types of motivated inference processes. Accuracy motivation is generally thought to affect information processing by altering the quantity of cognitive effort an individual allocates to a judgment task (Chaiken et al., 1989; Kruglanski & Freund, 1983; Simon, 1957). Intensity of processing has also been posited as the mechanism underlying the effects of control motivation on attributional judgments (Pittman & D'Agostino, 1985). Thus, another advantage of a quantitative view of self-serving bias is its position that a single mechanism may underlie many different motivational influences on judgment (see Kruglanski, 1990, for a similar view).

Implied in all of this integration, of course, is the fact that numerous factors can affect how deeply a given piece of information is processed, and consequently, any or all of these factors can potentially moderate the effects that an individual's preferences will have on a given judgment. It seems that judgment is more often than not "multiply motivated" and consists of desires for an accurate view of the world and for a particular view of the world that combine to determine the course and outcome of the information-processing sequence (Heider, 1958; Kruglanski, 1990). This view of the human thinker as fundamentally constrained by adaptive concerns and human judgment as ultimately a compromise between preferences and plausibility is central to the current analysis of motivated inference.

It is neither the case that people believe whatever they wish to believe nor that beliefs are untouched by the hand of wishes and fears. Both passion and reason are characteristic of human thought. The research presented here continues the process of recognizing this duality and conceptualizing the passionate side of human judgment within the more general information-processing framework from which it was once banished.

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Received July 10, 1991
Revision received March 20, 1992
Accepted March 27, 1992 ■

Hill Appointed Editor of the *Journal of Counseling Psychology*, 1994–1999

The Publications and Communications Board of the American Psychological Association announces the appointment of Clara E. Hill, PhD, University of Maryland, as editor of the *Journal of Counseling Psychology* for a 6-year term beginning in 1994. As of January 1, 1993, manuscripts should be directed to

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Manuscript submission patterns for the *Journal of Counseling Psychology* make the precise date of completion of the 1993 volume uncertain. The current editor, Lenore W. Harmon, PhD, will receive and consider manuscripts until December 31, 1992. Should the 1993 volume be completed before that date, manuscripts will be redirected to Dr. Hill for consideration in the 1994 volume.