Mood and Heuristics: The Influence of Happy and Sad States on Sensitivity and Bias in Stereotyping

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The influence of mood states on the propensity to use heuristics as expressed in stereotypes was examined using signal detection statistics. Participants experienced happy, neutral, or sad moods and "remembered" whether names connoting race (African American, European American) belonged to social categories (criminal, politician, basketball player). Positive mood increased reliance on heuristics, indexed by higher false identification of members of stereotyped groups. Positive mood lowered sensitivity (d'), even among relative experts, and shifted bias (β) or criterion to be more lenient for stereotypical names. In contrast, sad mood did not disrupt sensitivity and, in fact, revealed the use of a stricter criterion compared with baseline mood. Results support theories that characterize happy mood as a mental state that predisposes reliance on heuristics and sad mood as dampening such reliance.

Shifts in mood states occur routinely, easily, and swiftly. Finding a dime in a phone booth, reminiscing about a happy event from childhood, or the mere presence of a sunny day can elevate one's happiness, just as experiencing the death of a fictional character on film, losing even an ill-fitting hat, or listening to Prokofiev's *Russia Under the Mongolian Yoke* (played at half speed) can produce a depression in affect. The obviousness of such an observation, that moods can be easily and ordinarily created, is offset by the sometimes surprising effects that moods can have on thought, feeling, and behavior. In the last two decades, psychologists have discovered that although the source of moods may be mundane events, and although knowledge of their influence may lie outside conscious awareness and control, they do systematically influence mental and social life: judgments of life satisfaction (Schwarz & Clore, 1983, 1988), prosocial behavior (Isen, 1987), negotiation and bargaining (Forgas, 1998b), reliance on dispositional characteristics (Forgas, 1998a), attitude change (Bless, Bohner, Schwarz, & Strack, 1990; Mackie & Worth, 1989; Schwarz, Bless, & Bohner, 1991), and motivation and action (Martin, Ward, Achee, & Wyer, 1993; Schwarz & Bohner, 1996). The innovative experiments that comprise these demonstrations have now made commonplace the expectation that transient shifts in mood do influence mental processes and social behavior in systematic ways.

In this article, we focus on a particular facet of the relationship between mood and cognition, in which theory has prompted counterintuitive predictions about issues of obvious social importance—the manner in which transient mood states can influence stereotype use. Research on this topic has attracted attention in recent years, partly because stereotyped judgments provide a theoretically interesting location to test theories of mood's effect on heuristic thinking more generally. In addition, such research has produced unexpected findings about the influence of mood on stereotyping. Of central interest to us is the question of how general knowledge about social groups (Many *X*s have property *Y*) is used in judging individuals who bear some mark of the group (Does this *X* have property *Y*?). The present experiments were designed to examine how mood influences stereotype use, with primary focus on the mechanisms involved in social judgment. In particular, mood effects on two mechanisms by which stereotypes are expressed were explored. First, does mood damage or strengthen one's capability to distinguish signal from noise in social category judgments? That is, does mood influence the sensitivity with which items in two categories (e.g., basketball players and nonplayers) are discriminable? Second, does mood shift the standard for judgment by relaxing or toughening the

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criterion? That is, does mood systematically raise or lower the threshold for judging category membership—Is this person a criminal? A politician? A basketball player?

Contemporary research on mood and stereotyping is built on a foundation set in the early decades of the century, although both in precision of measurement and theorizing, modern work bears little resemblance to past research. Recent research on mood and stereotyping can be summarized in clusters of findings that appear to be superficially discrepant, but that are nonetheless interpretable if the underlying processes being tapped are carefully scrutinized. In particular, the research shows that the type of mood state that is created and the nature of the decision process that is engaged can significantly and predictably influence social judgment.

General theories of mood and cognition proposed by Schwarz and Bless (Bless et al., 1990; Bless, Clore, et al., 1996; Bless & Fiedler, 1995; Bless, Mackie, & Schwarz, 1992; Bless, Schwarz, & Wieland, 1996; Schwarz, 1990; Schwarz & Bless, 1991; Schwarz & Clore, 1983, 1988) and specific experiments conducted by Bodenhausen and colleagues (Bodenhausen, 1993; Bodenhausen, Kramer, & Susser, 1994; Bodenhausen, Sheppard, & Kramer, 1994) provide the most obvious connections to our focus on mood and heuristics in thinking. According to Schwarz (1990; Schwarz & Clore, 1983, 1988), mood states are assumed to provide information about the nature of the immediate situation. Depending on perceivers' goals at the time of judgment, positive mood serves as a signal of the absence of threat and hence provides information that all is well. As a result, happy individuals are not motivated to expend cognitive effort unless such expenditure is called for by other goals. A cognitive consequence of being in a positive mood is the higher likelihood of heuristic processing, with an example of such processing being the use of general knowledge about social groups in judgments of individual members, that is, stereotyping. On the other hand, negative mood is assumed to alert the individual that a problem in the environment awaits solution, thus motivating more detail-oriented, careful thinking and an avoidance of relying on heuristics. The mood-as-information approach (Schwarz, 1990) and the mood-and-general-knowledge model derived from it (Bless, Clore, et al., 1996; Bless, Schwarz, & Wieland, 1996) offer slightly differing predictions that are not important for the purpose of the present research, and we treat them as equivalent.

Insofar as positive mood creates a reliance on heuristics and such use is at the heart of stereotype use, positive mood ought to produce an increase in stereotyping, that is, greater reliance on general knowledge about social groups when judging individual members. Insofar as negative mood creates no reliance on heuristics, it should produce stereotyping effects that are comparable to baseline mood. However, if negative mood reduces reliance on heuristics, it should produce stereotyping effects that are significantly lower than in baseline mood. Importantly, all three predictions run counter to the notion that negative mood ought to increase stereotyping and that positive mood ought to reduce it. Such predictions also run counter to the basic premise of mood congruence theories (e.g., Bower, 1991) that judgments will follow the direction of one's mood, with happy individuals making more positive or favorable judgments, and sad individuals offering negative or unfavorable judgments. In addition, these predictions run counter to data showing mood congruity effects on probability estimates of the likelihood of events concerning health, crime, the economy, marriage, and so forth (see Mayer & Gaschke, 1988). Nonetheless, predictions derived from the mood-as-information and related views have received firm support, at least when considering positive mood, from recent experiments on mood and stereotyping (Bless, Schwarz, & Wieland, 1996; Bodenhausen, Kramer, & Susser, 1994; Bodenhausen, Sheppard, & Kramer, 1994; see Bodenhausen, 1993).

In one line of experiments conceptually similar to the present ones, Bodenhausen, Kramer, and Susser (1994) induced mood states by asking participants to write about happy past experiences (positive mood condition) or ordinary experiences (neutral mood condition). Then, they presented participants with a description of a student allegedly involved in misconduct (e.g., assault or cheating). When asked to rate the student's guilt, participants in a happy mood, compared with those in a neutral mood, rated "Juan Garcia" as more guilty compared with an otherwise identical "John Garner." Bodenhausen, Sheppard, and Kramer (1994) also showed that sad participants did not render such stereotypic judgments. These and other experiments (e.g., Bless, Schwarz, & Wieland, 1996) show that positive mood does indeed increase reliance on category knowledge in the form of stereotypes and that negative mood does not produce such effects. On the other hand, negative mood has not been shown to produce a decrease in stereotyping relative to baseline, as might be suggested by the mood-as-information and related views. Nevertheless, the importance of these studies lies in their confirmation of the counterintuitive idea that happy moods actually increase, rather than decrease, reliance on heuristics, a byproduct of which is the increase in reliance on stereotypes.

Consistent with such findings, other research shows disruption in processing resulting from a positive mood state, even when examining stereotype formation processes involving novel groups (Stroessner, Hamilton, & Mackie, 1992). In this study, participants in a positive mood state showed reduced attention to information about frequency and covariation (Stroessner et al., 1992). These data add further support to theorizing such as that offered by Fiedler and Forgas (1988), Mackie and Worth (1991), and Schwarz (1990), and experiments by Bodenhausen et al. (Bodenhausen, Kramer, & Susser, 1994; Bodenhausen, Sheppard, & Kramer, 1994), that positive mood significantly decreases reliance on careful, analytic processing. The data from negative mood states, however, remain less clear, showing both effects that clearly distinguish negative from baseline and positive mood conditions and effects that show similarities between positive and negative states compared with baseline. In fact, there is no clear evidence yet that sad mood significantly decreases reliance on stereotypes, compared with baseline.

We conducted three experiments to investigate the influence of mood states on stereotype use. The main goal was to create conditions under which we could not only observe whether positive and negative mood increased or decreased stereotype use (Experiment 1), but also identify the specific mental processes (e.g., sensitivity to category demarcation, strictness of decision criteria) that are disrupted by mood (Experiments 2 and 3). In so doing, this research draws on signal detection theory and its statistics of sensitivity (d') and bias (β) to analyze how temporary feeling states can produce shifts in the use of heuristics, in this case, stereotypes of social groups.

A simple paper-and-pencil task was introduced to measure stereotype use that could be completed within a few minutes and yet allowed multiple data points to be obtained per subject. Experiments 2 and 3 also allowed tests of the effects of expertise on mood-stereotyping effects to ascertain whether the effects of mood could be offset by expertise in the domain of judgment. That is, can superior knowledge in a domain compensate for the expected damaging effects of positive mood and promote the careful thinking attributed to negative mood?

The goal of this research was not to distinguish among existing theories of mood and cognition. Rather, these experiments were designed to investigate specific components of the decision process (e.g., sensitivity, bias) that underlie effects of transient mood state on stereotype use, and as such to understand mood's impact on the use of heuristics more generally.

Experiment 1

Experiment 1 was designed to test a procedure to examine the influence of positive mood on stereotype use. First and last names connoting race were used as stimuli because they are simple yet effective communicators of social information such as race/ethnicity, gender, and age (Allport, 1954; Banaji & Greenwald, 1995; Kasof, 1993). Presenting participants in happy and neutral mood with a list of names (African American and European American), we asked for a judgment of whether each name on the list belonged to the category "criminal." We gave participants another list of names and asked them to judge whether each name belonged to the category "politician." This procedure, without the mood manipulation, was previously used by Walsh, Banaji, and Greenwald (1995) to demonstrate how knowledge about social groups can induce false beliefs about individuals (e.g., the belief that the person is a criminal; see Banaji & Bhaskar, 1999, for a discussion). In those experiments, participants misidentified proportionally more African Americans as criminals and more European Americans as politicians. If this procedure shows sensitivity to mood, it will serve as the groundwork for subsequent tests (in Experiments 2 and 3) of the decision components (sensitivity and bias) that are influenced by mood.[1] In this experiment, if we find that compared with baseline mood, a happy mood produces greater false identification of African American names as criminals and European American names as politicians, we will have evidence of the greater reliance on heuristics (stereotype use) in happy mood states.

Method

Participants

Fifty-eight Yale University students (28 men and 30 women) participated in this experiment. Of these, 39 were European American, 4 were African American, and 15 were Asian American. Participants received either partial credit toward an introductory psychology course requirement or compensation of $8.

Design

The design was a 2 (mood: positive vs. neutral) × 2 (target race: African American vs. European American) × 2 (task: criminal judgment vs. politician judgment) mixed design with the latter two factors manipulated within participants.

Materials and Procedure

Upon arrival, each participant was greeted by an experimenter and informed about participating in two different experiments, a "media evaluation" study and, subsequently, a "name recognition" study. Each participant signed a consent form expressing willingness to participate. The media evaluation experiment, which served as the mood induction, was introduced as a pilot study concerning the impact of various media presentations. Participants were randomly assigned to either a positive mood condition to see a 10-min video segment from *The David Letterman Show* depicting "stupid human tricks" (see Wegener & Petty, 1994, for previous use of the same tape) or a neutral mood condition to see a 10-min video segment containing natural scenes of mountains, rivers, and so forth. Immediately after viewing the videotape, participants rated their mood state using 7-point Likert-type scales. Six items measured mood (happy, sad, content, satisfied, disappointed, exhilarated) and these were embedded among nine other items that captured emotional states (e.g., angry, surprised, fearful, proud, ashamed, guilty, remorseful, envious, jealous; see Palfai & Salovey, 1993).

In a second, ostensibly independent name recognition experiment, participants were presented with two different name lists (A and B) in sequence (see Appendix A). Each task (criminal and politician judgment) used a unique list of names and the order of criminal and politician judgments was counterbalanced. Each list consisted of 68 names previously judged to be names of European Americans (e.g., John Olson, James Pierce, Daniel Stuart) and 12 names judged to be names of African Americans (e.g., Lamont Smith, Terrell Tucker, Leroy Washington), which originated from Walsh et al. (1995). The proportion of White and Black names was 85% and 15%, respectively, to roughly approximate the distribution in the population of the United States. Participants were asked to read each name on the list and report if they judged the name to be that of a criminal (or politician) without missing any relevant names.

After completing the criminal and politician judgment tasks, participants were asked to respond to a short questionnaire consisting of six probability estimation items as a second and less direct check on the mood manipulation. Previous research has shown that participants in a happy mood overestimate the incidence of positive events compared with participants in neutral and negative moods (Mayer & Gaschke, 1988; Mayer, Gaschke, Braverman, & Evans, 1992). Items consisted of statements about pleasant and unpleasant events concerning health, crime, economy, marriage, and so forth. Participants expressed their estimates of the likelihood of each event in percentage scores. After completing the questionnaire, they were probed for suspicions about the research and thoroughly debriefed.

Results and Discussion

Mood Manipulation Checks

First, subjective mood ratings were obtained by averaging the item scores from the six-item mood check (items "sad" and "disappointed" were reverse scored), and a t test was performed to assess the effect of video stimuli on mood ratings. As expected, participants in the condition viewing a segment from *The David Letterman Show* (positive mood induction) reported experiencing a more positive mood ($M = 5.26$, $SD = 0.70$) than those in the condition viewing nature scenes (neutral mood induction), ($M = 3.98$, $SD = 1.05$); $t(56) = 5.49$, $p < .0001$. On the second,

[1] We are indebted to Joe Forgas for stimulating the idea for these studies by his talk to the Person Memory Group in 1997.

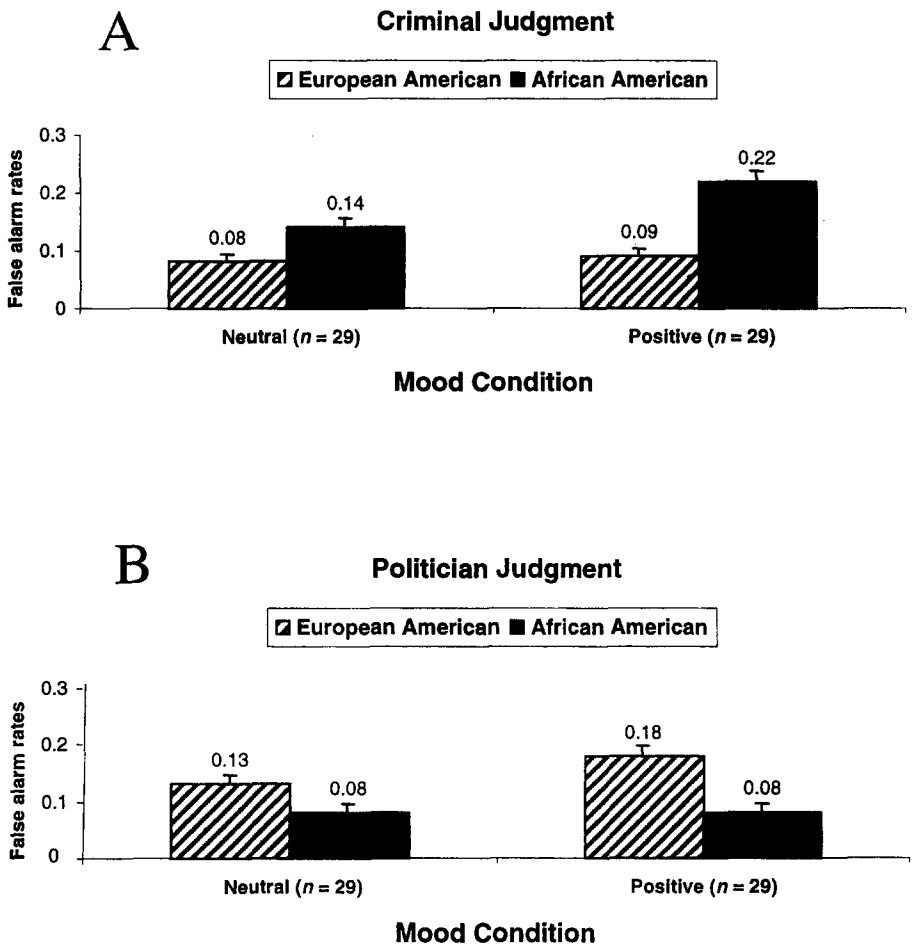

Figure 1. Proportions of names in Experiment 1 ($N = 58$) misjudged to be criminals (A) and politicians (B) as a function of race and mood conditions.

less direct measure of mood, participants' probability estimates of pleasant and unpleasant life events were assessed. Following the procedure reported in Mayer et al. (1992), the sum of the percentage scores of unpleasant event items was subtracted from the sum of the percentage scores of pleasant event items for each participant (scale ranged from −300 to +300). As expected, confirming the findings from previous research, participants in a positive mood were more optimistic in their estimates ($M = 69.00$, $SD = 57.96$) than were those in a neutral mood ($M = 30.89$, $SD = 79.26$), $t(56) = 2.09$, $p < .05$. Both the self-rated mood state and the less direct probability estimation task yielded expected differences between positive and neutral mood conditions.

Criminal and Politician Judgments

A proportion of African American and European American names judged to be names of criminals and politicians was computed. This proportion served as the main dependent variable for all subsequent analyses. A 2 (mood: neutral vs. positive) × 2 (target race: African American vs. European American) × 2 (task: criminal judgment vs. politician judgment) analysis of variance (ANOVA) was performed on the proportions. As predicted, the three-way interaction was significant, $F(1, 56) = 10.86$, $p < .002$, suggesting that the Mood × Target Race interaction varied as a function of type of judgment (criminal or politician).

Criminal judgment. A 2 (mood: neutral vs. positive) × 2 (target race: African American vs. European American) ANOVA was conducted on the proportions of names identified as criminals.[2] Across mood conditions, African American names were more likely than European American names to be misjudged as criminals (see Figure 1), $F(1, 56) = 38.32$, $p < .0001$. In addition, a Mood × Target Race interaction, $F(1, 56) = 6.25$, $p < .05$, was also present. The tendency to falsely identify more African American names as criminals was greater in the positive mood condition than in the neutral mood condition. An analysis of the simple effect

[2] Two-way analyses were first conducted using participant gender as a variable, but no effects of this variable were found (all Fs < 1) and hence the variable was dropped from subsequent analyses. The small number of Black participants in this experiment precluded any analyses involving race as a variable. However, when data from Black participants were dropped, parallels of the results and significance levels did not change and, hence, data from these participants were retained in all analyses reported here.

of White and Black names in the neutral mood condition indicated that stereotyping was present even in the neutral mood condition, $t(56) = 2.61$, $p < .05$, replicating Walsh et al. (1995). Thus, the Mood × Target Race interaction was carried by the stronger stereotyping effect in the positive mood than in the neutral mood condition.

Politician judgment. A 2 (mood: neutral vs. positive) × 2 (target race: African American vs. European American) ANOVA on the proportions of names identified as politicians revealed a higher likelihood to misjudge European American names to be politicians than African American names across mood conditions (see Figure 1), $F(1, 56) = 35.30$, $p < .0001$. Again, a Mood × Target Race interaction effect was significant, $F(1, 56) = 4.49$, $p < .05$, indicating that the tendency to make stereotypic judgments is stronger in the positive mood condition. However, the stereotype effect in the neutral condition was also significant, $t(56) = 2.70$, $p < .05$, showing an opposite and symmetrical pattern to the criminal judgment task and replicating Walsh et al.'s (1995) baseline condition. This suggests that the Mood × Target Race interaction was driven by a greater stereotyping effect in the positive mood condition compared with the neutral mood condition.

The results of Experiment 1 showed a greater tendency of individuals to rely on beliefs of social groups in the positive mood condition than in the neutral mood condition.[3] Happy participants misidentified more than twice as many African American names compared with European American names as criminals. They also misjudged approximately twice as many European American names as African American names to be politicians. The findings of Experiment 1 are consistent with predictions derived from current theories of affect and cognitive processing (the mood-as-information, the mood-and-general-knowledge, and the cognitive capacity models) all of which predict heightened stereotypic responses by happy individuals. Mood increased stereotyped judgments irrespective both of the social group that was judged (African American, European American) and of the dimension of judgment that was used (criminal, politician). Such a finding gives credence to the idea that positive mood influences a fundamental aspect of the decision process, because it does not appear to be a function of superficial attributes such as the type of group judged or the dimension of judgment. It also suggests that in the future, mood's influence on social judgment may be explored both by using properties other than names (e.g., skin color; see Dasgupta, Banaji, & Abelson, 1999) and when judgments of groups as entities (not just individual group members) are offered (Abelson, Dasgupta, Park, & Banaji, 1998).

Although Experiment 1 demonstrated that positive mood increases stereotype use, how it produces such an effect is not known. Two components of the decision process were tested in Experiments 2 and 3. Such mechanisms have not been addressed by previous research on mood and stereotyping and they guided the design of the next experiment.

Experiment 2

Experiment 2 was designed in general to provide a conceptual replication of Experiment 1 but in particular to explore the mechanism by which beliefs about groups come to be applied in assessments of individuals. The focus was on understanding the mechanisms by which beliefs about groups come to be applied with greater ease when a positive mood is created, however ordinary and mild such a mood state may be.

Signal Detection Analyses and the Measurement of Stereotype Application

The main purpose of Experiments 2 and 3 was to test the effects of mood on sensitivity and bias (criterion), as a way to understand the cognitive processes that deviate in positive and negative mood states. In so doing, these experiments can reveal more specifically how transient mood states change the use of heuristics in judgment. Names of Black and White basketball players served as the signal against which the false identification of names of nonbasketball players could be judged. In Experiment 1, it was not possible to obtain such measures because of the near impossibility of obtaining equally well-known and recognizable names of Black and White criminals and politicians that could serve as signal.

Sensitivity as an Indicator of Stereotyping

Banaji and Greenwald (1995) mapped the two components of signal detection theory (Green & Swets, 1966), sensitivity and bias, onto two mechanisms by which stereotypes may operate. For example, consider the stereotype that women are poor at mathematics. The application of the stereotype in judgments of individual women may take one or both of two forms. First, application of the stereotype may occur by blurring distinctions within members of the stereotyped group. Thus, women as a group may be seen to be homogeneous along the dimension of mathematical ability (i.e., "they are all the same"). The expected effect of stereotyping here is not that women's mathematical ability is judged to be low—rather, reliance on a stereotype should reduce the ability to discriminate individual women from each other when judging their mathematical ability. Signal detection theory's component of sensitivity captures this component of discrimination, and in the present study it is used as a measure of a form of stereotyping that we will call *sensitivity stereotyping.*

Such a process is well identified in research on group judgment and stereotyping. Reduced sensitivity to discriminate among group members has been shown when comparing in-group with out-group perceptions, with perceivers being less sensitive to differences among out-group members, known as the "outgroup homogeneity effect" (Linville, Salovey, & Fischer, 1986; Ostrom & Sedikides, 1992; Park & Rothbart, 1982). If the effect that mood has on stereotyping occurs by reducing sensitivity, we should

[3] It is possible that the stereotyping effect in both neutral and positive mood conditions was created by a few peculiar names misjudged with higher frequency. For each stimulus name, we computed its frequency of being identified as either criminal or politician. In the criminal/politician judgment tasks, the mean frequencies of African American and European American names misjudged as criminals or politicians were 8.25 and 6.75, respectively. They were evenly distributed except for one African American name (Leroy Washington) that was particularly high (18) in frequency of misidentification. However, reanalyzing the criminal judgment data after removing this item did not alter the reliability of any findings. For both tasks, the overall stereotyping effect could not be attributed to a few, uniquely distinct, stimulus names.

observe it by using signal detection theory's statistic of *d* prime (*d'*). Specifically, in Experiment 2, positive mood may reduce sensitivity in discriminating basketball players from nonbasketball players when such players are African Americans, because their group is stereotypically associated with athletic excellence in this sport. If positive mood does indeed reduce the ability to discriminate among Black compared with White players, we should obtain lower *d'* scores in judgments of Black compared with White basketball players under positive mood but not under neutral mood conditions.

Decision Criterion as a Measure of Stereotyping

A second mechanism of stereotype use can be mapped on to signal detection theory's concept of bias (β). Returning to the example of math ability, another way in which stereotypes may also be applied is through the decision criterion for judging math ability. If the belief is that Asians as a group have superior math ability, an individual Asian may be judged to have superior ability (compared with an equally talented non-Asian) because a differential (lower) criterion is set when judging the math ability of Asians. In fact, Banaji and Greenwald (1995) found that participants did set a lower criterion in judging the fame of male compared with female names, such that familiar but nonfamous males were more likely to be given the benefit of fame than equally familiar and nonfamous female names. Independent of the sensitivity component, signal detection theory's component of bias (β) indicates the subjective threshold or criterion that reveals the stringency of the decision rule. A low threshold compared with a high threshold indicates the placement of a more lenient criterion in giving a signal response (e.g., "basketball player"). We refer to this form of stereotyping as *criterion stereotyping.*

If mood's effect on stereotyping occurs through the setting of a differential criterion for Black versus White basketball players, then we should be able to observe it in the statistic of β. Specifically, if mood influences stereotyping through such a mechanism, athletic excellence associated with African Americans should result in a lower setting of the criterion (β) when judging Black compared with White basketball players under positive, but not neutral, mood. In other words, happy participants may set a lower (less strict) criterion for judging African American names as basketball players (compared with equivalent European American names).

Signal detection statistics recompose hit and false alarm rates for dichotomous stimuli (signal and noise) into measures of the perceiver's sensitivity to signal presence (*d'*) and the perceiver's criterion or threshold used for the judgment (β). Such a theoretical tool is useful to the present study because it can potentially point to the mechanism underlying mood's influence on stereotyping. The advantage of signal detection analysis is the ability to assess the independent contribution of these two paths, both of which remain unidentified at the present time and can be components of mood's effects on heuristic-based thinking.

Pretest

A pretest was conducted to obtain a stimulus set of Black and White basketball players. Specifically, the pretest was created to provide control over possible confounding variables such as the degree of fame of Black and White basketball players and the recognition of the race of Black and White players by their names. We used *The Official NBA Basketball Encyclopedia* (National Basketball Association [NBA], 1994) to gather names of basketball players who (a) had played in recent years and (b) were of sufficient fame so as to be recognized by a large number of college students. To obtain this set, we selected names of players who began their NBA career in the 1980s and 1990s. We also selected players who scored in excess of an average of 7 points per game. Based on these criteria, we obtained 206 names of Black and White basketball players (179 Black and 27 White players).

As a second step, we obtained ratings on two dimensions for a measure of (a) baseline recognition of basketball players so as to equate recognition of Black and White players and (b) the stereotypicality of the names themselves so as to match the degree to which race could be detected from names of basketball players compared with nonplayers whose names served as distractors. Eleven participants identified whether each of the 206 names represented an NBA basketball player or not, by placing a check mark beside each name they knew with confidence to be a basketball player. They also judged the degree to which each name divulged the ethnicity of the person (European American or African American) on a 7-point bipolar scale (range = Black 3 to White 3, with 0 as the midpoint). In assessing the ethnicity of the name, participants were instructed to ignore their knowledge of the player's race and to judge the degree to which the name itself indicated that the person was Black or White. Based on the pretest, it was possible to cull well-matched names for a total of 10 names of Black players and 10 names of White players. The selected names were (a) identified as basketball players by 50% to 80% of the respondents, with very famous players (e.g., Michael Jordan) being excluded and (b) Black and White players whose names were stereotypically Black (mean ratings over 1.5 in likelihood to be Black on the 7-point scale) and White (mean ratings over 1.5 in likelihood to be White on the same scale). (For the list of names of Black and White players chosen for the final set, see Appendix B.)

Method

Participants

Sixty-eight Yale undergraduates (29 men and 39 women) participated in the experiment. Of them, 41 were European American, 8 were African American, and 19 were Asian American. They received either class credit for partial fulfillment of an introductory psychology course requirement or compensation of $8 for their participation.

Materials and Procedure

As in Experiment 1, participants were informed that they would participate in two independent experiments of media evaluation and name recognition. The procedures and the materials used for the first session (mood induction) were identical to those in Experiment 1.

In the second ostensibly unrelated name recognition experiment, participants were presented with a list of 40 names in random order. The list consisted of 10 names in each of the four categories: Black and White basketball and nonbasketball players. The 20 names of players were selected from the pretest and the 20 names of nonplayers were selected from lists used in Experiment 1. Participants were asked to identify whether each name was the name of a basketball player or not, without being concerned about their expertise in basketball.

Table 1
Mean Hit and False Alarm Rates by Mood Condition, Race of Target, and Expertise Level of Participants (Experiment 2)

	Neutral mood (n = 34)						Positive mood (n = 34)					
	HE (n = 16)		LE (n = 18)		Overall		HE (n = 15)		LE (n = 19)		Overall	
Rates	*M*	*SD*	*M*	*SD*	*M*	*SD*	*M*	*SD*	*M*	*SD*	*M*	*SD*
Hit												
White	.81	.19	.33	.23	.56	.32	.78	.29	.33	.17	.53	.32
Black	.74	.20	.35	.14	.54	.26	.71	.17	.39	.21	.53	.25
False alarm												
White	.02	.04	.13	.12	.08	.11	.02	.05	.08	.10	.05	.08
Black	.02	.04	.12	.10	.07	.09	.07	.08	.24	.16	.16	.15

Note. HE = high experts; LE = low experts.

After completing the player judgments, participants were asked to help the experimenter by providing data for future studies. They completed three short questionnaires, the first of which was a six-item probability judgment questionnaire (Mayer & Gaschke, 1988; Mayer et al., 1992) used in Experiment 1 that served as a mood manipulation check. Because individual differences in expertise about basketball were expected, and because such individual differences were expected to influence memory (Gauthier & Tarr, 1997; Lewellen, Goldinger, Pisoni, & Greene, 1993), the next questionnaire asked about (a) the hours per week spent watching basketball games during the season (4 points), (b) names of teams that won Eastern and Western conference championship titles during the past 3 years (3 points), and (c) knowledge of basketball rules (e.g., 3-second violation; 3-point shot), to form an 11-point expertise scale ranging from 0 (*lowest expertise*) to 10 (*highest expertise*). Lastly, participants were presented with a list of the 40 names used in the experiment in alphabetical order. They were instructed to judge whether each of the names was likely to be the name of a Black or White person, irrespective of the actual ethnicity of the person. This task was designed to obtain a subjective rating of the race of each name and to obtain verification of the manipulated ethnicity of names. After completing this questionnaire, participants were asked to describe what they believed the study to be about and were debriefed.

Results and Discussion

Mood Manipulation Check

As in Experiment 1, those who watched the positive mood video reported feeling happier (M = 5.37, SD = 0.68) than those who watched the neutral mood video (M = 4.23, SD = 0.98), $t(66) = 5.56$, $p < .0001$, on the subjective ratings of mood. Additionally, on the probability estimation ratings, participants in the happy mood condition yielded more optimistic responses (M = 62.41, SD = 52.73) than those in the neutral mood condition (M = 33.03, SD = 43.95), $t(66) = 2.31$, $p < .03$. These results indicate that the mood manipulation was effective in producing the expected mood states.

Signal Detection Analyses

To compute the statistics of d' and β, we first obtained hit and false alarm rates. In this study, hits refer to the proportion of names of basketball players correctly judged as basketball players, and false alarms refer to the proportion of names of nonplayers incorrectly judged to be basketball players. Separate hit and false alarm rates were obtained for African American and European American names for each participant. The mean hit and false alarm rates are presented in Table 1. On the basis of the expertise measure (11-point scale), participants were categorized as either high experts (5–10) or low experts (0–4). Because participants' expertise in basketball moderated the effect, we also present the data by expertise level.

Hit rates. A 2 (mood: neutral vs. positive) × 2 (target race: African American vs. European American) ANOVA was performed on hit rates.[4] As can be seen in Table 1, participants were equally able to identify Black and White players in both neutral and positive mood conditions. This anticipated lack of a race effect on hits is a consequence of the successful matching of the fame of Black and White players. Also as expected, high experts showed substantially higher hit rates than low experts, $F(1, 64) = 92.74$, $p < .0001$.

False alarm rates. African American names were more likely than European American names to be misidentified as names of basketball players (see Table 1), $F(1, 66) = 18.33$, $p < .0001$. In addition, the false alarm rates for African American names were noticeably higher in the positive mood condition, as observed in a Mood × Target Race interaction, $F(1, 66) = 20.36$, $p < .0001$. Analyses of simple effects revealed that the mean for the positive

[4] All ANOVAs with the same 2 (mood) × 2 (target race) design were first conducted on hit and false alarm rates including participant gender and race each as an independent variable. Participant gender produced significant main effects on both variables, $F(1, 64) = 15.98$, $p < .001$, and $F(1, 64) = 14.71$, $p < .001$, respectively. The female participants showed lower hit rates (M = .43) than male participants (M = .67), and they showed higher false alarm rates (M = .13) than male participants (M = .04). This gender difference was shown to be a function of expertise differences, with more males being experts (the ratio of male experts to female experts was approximately 7:3). Importantly, the inclusion of expertise in the ANOVA model removed the main effect of participant gender, indicating that the effect of participant gender was in fact a function of expertise. The gender effect is not discussed in subsequent analyses, although the effect of expertise will continue to be reported and interpreted. There were too few Black participants to meaningfully examine race effects. However, the observed pattern here and in all subsequent experiments remained whether Black participants were included or not. All analyses, therefore, include the data from Black participants.

mood and African American target race condition was significantly different from all other means (all $ps < .01$). Again, expertise was included as an independent variable in the analysis and, as expected, false alarm rates of low experts were significantly higher than those of high experts, $F(1, 64) = 25.75$, $p < .0001$. In addition, a Mood × Target Race × Expertise three-way interaction was significant, $F(1, 64) = 6.57$, $p < .02$. Two separate tests of Mood × Target Race interactions showed that the interaction was significant only for low experts ($p < .001$).

Signal detection analyses were performed by decomposing hit and false alarm rates into (a) estimates of each participant's sensitivity (d') or ability to discriminate between basketball players and nonplayers and (b) bias (β) or criterion used by participants to make a basketball player judgment (for calculations, see Hochhaus, 1972). Analyses to compute β were performed after the data were log transformed to allow better approximation to a normal distribution. Another adjustment to the data was made to address the problem of empty cells (e.g., 0% false alarms or 100% hits in one or more conditions for a participant), because signal detection analyses require that hit and false alarm rates be neither 0% nor 100%. We used the adjustment procedures (i.e., model-sensitive correction and continuity correction) developed by Banaji and Greenwald (1995), who showed through simulation data that these adjustment procedures were more effective than traditional fix-up methods. Mean values of d' are presented in Figure 2 and those of log β are presented in Figure 3. These two estimates are considered to be theoretically and statistically independent (Klatzky, 1980).

Results for d'. The results for d' indicated that participants were less cognitively sensitive to the distinction between signal (basketball players) and noise (nonbasketball players) when judging African American names compared with judging European American names across mood conditions, $F(1, 66) = 8.49$, $p < .005$. This main effect was, however, qualified by a significant interaction of Mood × Target Race, $F(1, 66) = 5.19$, $p < .03$, showing that sensitivity was substantially poorer when African American names were judged in a positive mood condition compared with the other three conditions. Analyses of simple effects showed that the mean for the positive mood and African American target race condition was significantly different from all other means (all $ps < .01$).

When expertise was added to the analysis as an independent variable, high experts were found to be more accurate than low

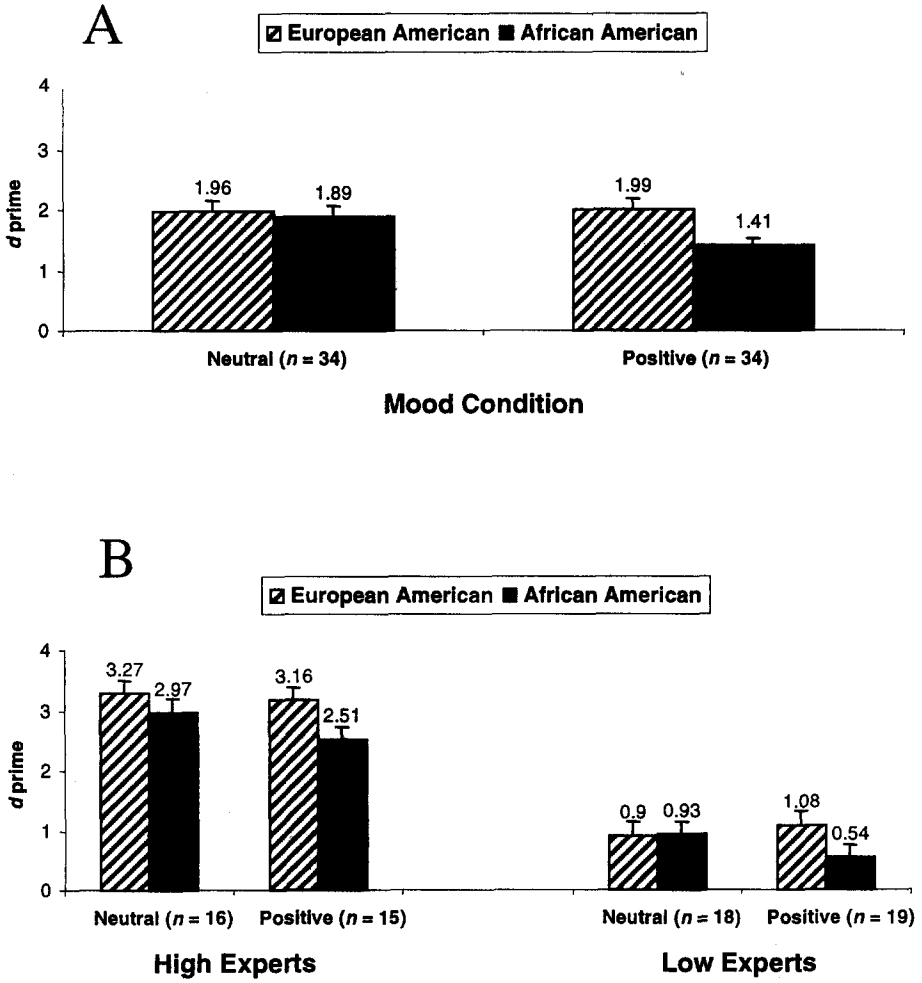

Figure 2. *d* prime as a function of mood and target race (A) and as a function of mood, target race, and expertise (B) in Experiment 2 ($N = 68$).

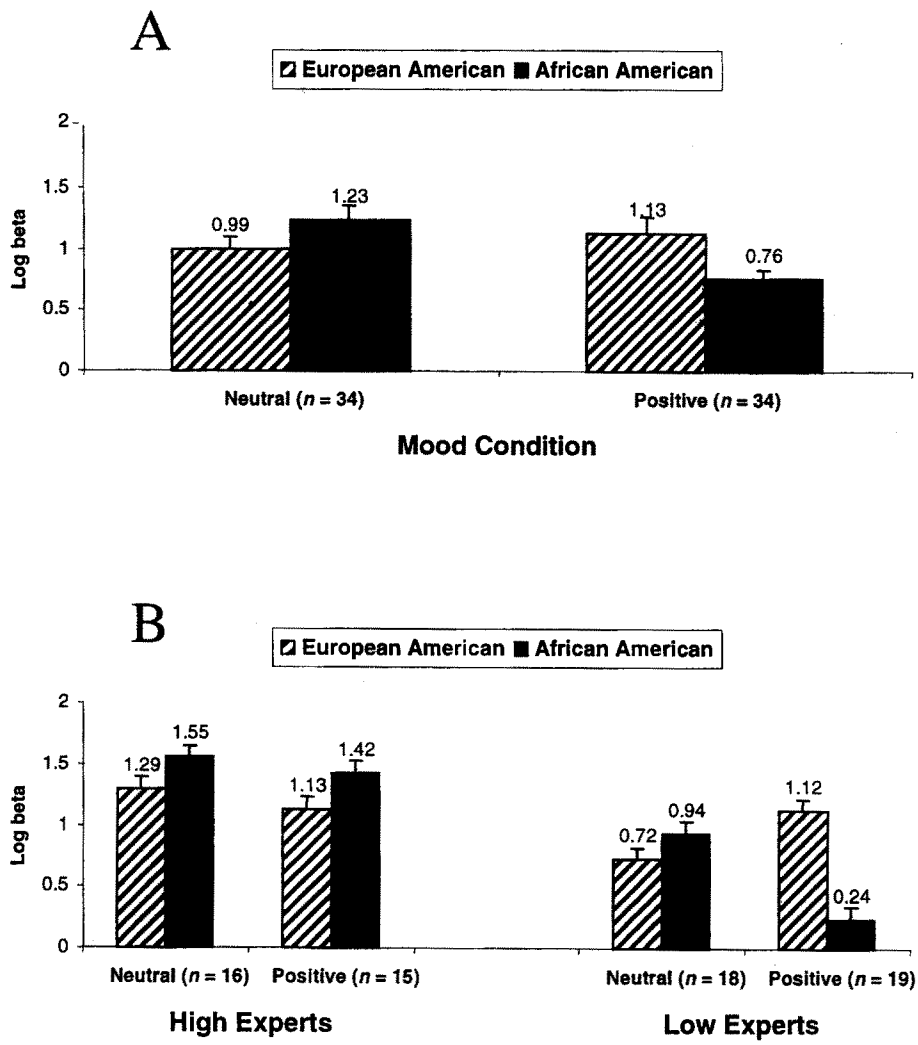

Figure 3. Log β as a function of mood and target race (A) and as a function of mood, target race, and expertise (B) in Experiment 2 ($N = 68$).

experts in discriminating basketball players from nonbasketball players, $F(1, 64) = 101.10, p < .0001$. Interestingly, expertise did not interact with other variables, showing that both high and low experts equally succumbed to mood effects.

Analyses of simple effects showed that the means for the positive mood and African American target race condition were significantly different from any others for both high and low experts. In other words, superior knowledge about basketball did not protect high experts from the reduced sensitivity that produced positive mood stereotyping. They, like their low expert counterparts were more likely to fail in discriminating Black players from nonplayers after watching a few minutes of the Letterman show.

Results of log β. An ANOVA on log β showed a significant interaction effect of Mood × Target Race, $F(1, 66) = 5.11, p < .03$, indicating that differing criteria were set across different conditions. Analyses of simple effects showed that in the positive mood condition, a lower (less strict) criterion was set when African American names were judged, $t(33) = 1.93, p < .06$. In contrast, this simple main effect of White and Black names was not significant in the neutral mood condition, $t(33) = 1.20$, *ns*. Thus, a uniquely lower criterion was set for judgment when the target was African American and when mood was positive.

When we included expertise as a variable in the ANOVA, high experts were shown to set a higher (more strict) criterion than low experts, $F(1, 64) = 7.71, p < .01$. In addition, a Mood × Target Race × Expertise three-way interaction was also significant, $F(1, 64) = 7.71, p < .01$, indicating that the overall Mood × Target Race interaction was moderated by expertise. Two separate Mood × Target Race interactions for each level of expertise showed that the Mood × Target Race interaction was significant only for low experts, $F(1, 64) = 7.71, p < .01$. No simple effects were significant in the high expert condition. Thus, unlike the findings obtained on the measure of sensitivity, expertise does appear to protect against criterion stereotyping. High experts were not influenced by mood states in setting criteria for judgment.

The results of Experiment 2 provide additional evidence that positive mood increases stereotype use.[5] By selecting African American and European American players of equivalent fame through the pretest, we were able to equate the hit rate on African American and European American players. However, false alarm rates differed markedly across mood conditions, replicating the results obtained in Experiment 1. That is, participants in a happy mood misidentified more Black names to be basketball players than participants in a neutral mood.

Sensitivity stereotyping does not capture the lay typical meaning of the term stereotyping, that is, a negative characterization of individuals or social groups. Rather, the effect of beliefs about social groups is observed in the (in)ability to discriminate among members of stereotyped social groups. In this experiment, a discrimination was sought between basketball and nonbasketball players who varied in race. Basketball was the category of choice because it (a) is strongly race linked and (b) was possible to obtain stimulus items (names) that could clearly represent signal (players) and noise (nonplayers). We showed that sensitivity stereotyping took a particular form: lowered accuracy when positive mood was the affective state and when members of a social group (African Americans) associated with the attribute (basketball) were the target of judgment. The theoretical contribution of this finding lies in pinpointing that positive mood influences a fundamental aspect of memory and judgment: Being happy selectively reduces the ability to be able to distinguish correct from incorrect, but only when the social category of the target is relevant to the judgment dimension. Because sensitivity (unlike bias) is considered to be the gold standard of memory ability, this finding is important at least in its demonstration that affect influences more than judgment criterion.

A second form of stereotyping was also tested in Experiment 2. Criterion stereotyping was tested by measuring the strictness of the standard that was used in identifying individuals as basketball players. In this case, we observed that mood and race of target interacted yet again, resulting in differential bias: Happy participants set a significantly lower criterion (a) when judging Black than when judging White names and (b) compared with participants assigned a neutral mood. For such criterion stereotyping, expertise in the domain did play a buffering role; only low, but not high, experts showed differences in bias as a function of mood and target race.

Although the present research was not designed to specifically examine the effects of expertise on mood and stereotyping, the effects of expertise were both potent and revealing. Expertise in a domain implies not only greater knowledge but also confidence in one's ability to use such knowledge, and both these attributes of expertise ought to influence the extent to which one is susceptible to unwanted influences on judgment and decision making. The results from Experiment 2 show two noteworthy effects of expertise, one of which suggests the frailty of expertise to protect against the influence of affective state, the other of which shows the buffering aspect of expertise against bias. Although they showed far better knowledge in identifying names of basketball players in general, experts were surprisingly similar to nonexperts in sensitivity when judging Black names under a positive mood. That expertise did not protect against this sensitivity stereotyping can be interpreted as evidence of the deep influence of affect on social judgments that require the ability to discriminate signal from noise—a routine fact of everyday judgments of major and minor consequences. On the other hand, expertise did appear to protect against criterion stereotyping. Although nonexperts showed a marked lowering of the criterion for judging Black names under positive mood, this effect was not shown by high experts.

Sensitivity as a measure of accuracy and bias as a measure of subjective criterion setting are fundamental to all judgment. The quality of social interaction crucially depends on accuracy in distinguishing between categories and the setting of an appropriate and fair criterion for judgment. To discover that such simple discriminations are compromised by ordinary affective states (e.g., a positive mood) or features of the target's social group (being African American) is surprising just as its implications are disconcerting. In Experiment 3, we examined more fully the nature of the constraints imposed by mood observed in Experiment 2.

Experiment 3

Experiments 1 and 2 demonstrated that positive mood increased reliance on beliefs about social groups in judgments of individual group members. Experiment 2 showed, in addition, that such an effect was located both in reduced sensitivity in separating signal from noise when judging those who belonged to a stereotyped group (sensitivity stereotyping) and in a lowered criterion for judging such individuals (criterion stereotyping). Because Experiment 2 provided the first such evidence of the effect of mood on stereotyping, Experiment 3 was designed, in part, to provide a replication of these findings.

Of greater conceptual relevance, Experiment 3 was designed to also explore the effects of negative mood on stereotyping. Previous studies have reported inconsistent findings about the effects of negative mood on cognitive processing (for reviews, see Hamilton, Stroessner, & Mackie, 1993), and as such the role that negative mood might play in the social judgment required in these experiments is not clearly identified. If any shift in mood state away from baseline mood places a general demand on resources that reduces sensitivity and lowers the criterion for judgment (as observed in Experiment 2), then negative mood, insofar as it also consumes resources, ought to produce the same effects as those observed for positive mood. On the other hand, some theories of mood and cognition such as the mood-as-information (Schwarz, 1990) and mood-and-general-knowledge (Bless, Clore, et al., 1996) models predict that negative mood, because it creates an increase in effortful processing and lowers reliance on heuristics, ought to produce behavioral effects that are quite discrepant from those

[5] We analyzed the frequency of each stimulus name presented in the experiment to examine if the effect was produced by a few frequently misidentified names. The mean frequency of African American and European American nonbasketball player names misidentified as basketball players was 7.2 (ranging from 3 to 14) and 5.0 (ranging from 2 to 10), respectively. No single name was overly misidentified. In addition, we examined whether the Black and White names used were subjectively perceived by participants as such. In the dichotomous rating of Black or White, the mean percentage of Black names judged as Black was 86% (players, 84%; nonplayers, 88%) and the mean percentage of White names judged as White was 87% (players, 88%; nonplayers, 86%). In other words, names selected to represent the Black and White players and nonplayers were largely perceived as such by participants.

obtained under positive mood. Specifically, it may be that negative mood produces greater sensitivity to distinctions between signal and noise and leads to a more conservative criterion for judgment compared with positive mood. Experiment 3 offered the opportunity to test whether negative mood's effects can be pinned down to specific mechanisms, such as sensitivity and bias, in addition to providing a replication of the positive mood findings. With such data in hand, a more complete picture of how deviations from neutral mood influence social judgment becomes possible.

In Experiment 3, we also changed the material used to induce positive mood. In both Experiments 1 and 2, David Letterman's comedy performance was used to create positive mood. However, stand-up comedy routines often achieve their effects by relying on stereotypes of social groups. Although the particular episode used (stupid human tricks) was obviously unrelated to stereotypes of social groups, it left open the possibility that the observed effects of positive mood were due, at least in part, to the association between stand-up comedy and stereotypic jokes. To be reassured that the observed effects were not an artifact of a particular mood induction procedure, we pretested several video clips from a diverse set of movies and TV programs and selected a series of *Candid Camera* episodes (Funt & Zimbardo, 1993).

Method

Participants

Ninety Yale University undergraduates (45 men and 45 women) participated. Of these, 59 were European American, 9 were African American, and 22 were Asian American. They were recruited from the introductory psychology participant pool and received class credit for partial fulfillment of a requirement.

Materials and Procedures

The materials and procedures are the same as those in Experiment 2 except that (a) participants in the sad mood condition watched a 10-min video segment from the movie *Terms of Endearment* and (b) they indicated for each name they identified as a basketball player whether they "remembered" or "knew" the name.[6]

Results and Discussion

Mood Manipulation Check

A one-way ANOVA conducted on the means of the six-item mood check revealed a significant effect of mood condition on ratings, $F(2, 87) = 106.67$, $p < .0001$. Those who watched the positive mood video reported feeling happier ($M = 5.32$, $SD = 0.76$) than those who watched the neutral mood video ($M = 4.16$, $SD = 0.83$), who in turn reported feeling relatively happier than those who watched the negative mood video ($M = 2.29$, $SD = 0.84$). Pairwise comparisons of the means revealed that all three means differed significantly from each other (all $ps < .01$). A one-way ANOVA on the means of the probability estimation task also showed a significant main effect of mood, $F(2, 87) = 17.36$, $p < .0001$. Comparisons of the means demonstrated that participants in the positive mood condition yielded more optimistic responses ($M = 81.40$, $SD = 49.93$) than those in the neutral mood condition ($M = 26.67$, $SD = 41.21$), $p < .01$. However, there was no significant difference in probability estimations between the neutral mood condition and the negative mood condition ($M = 20.00$, $SD = 41.11$). This lack of effect is possibly from the faster fading of negative mood by the time the manipulation check was obtained, approximately 10 min after it was induced. Overall, these results indicate that the mood manipulation was generally effective in eliciting the expected mood states.

Signal Detection Analysis

As in Experiment 2, data from each participant were reduced to hit rates and false alarm rates. Table 2 presents the overall means of hit and false alarm rates, separated by expertise level of participants.

Hit rates. A 3 (mood: negative, neutral, positive) × 2 (target race: African American, European American) ANOVA on hit rates showed that no main effects or interactions were significant (see Table 2).[7] When the expertise variable was included, it yielded, as expected, a significant main effect, $F(1, 84) = 92.76$, $p < .0001$. Hit rates of high experts were substantially higher than those of low experts (see Table 2).

False alarm rates. A 3 (mood: negative, neutral, positive) × 2 (target race: African American, European American) ANOVA on false alarm rates revealed a significant main effect of mood, $F(2, 87) = 3.82$, $p < .03$. As the means in Table 2 show, false alarm rates were higher when participants were in a positive mood condition than when they were in a neutral or negative mood condition (all $ps < .05$). False alarm rates between the neutral and negative mood conditions were not significantly different. In addition, false alarm rates were higher when African American names were judged than when European American names were judged, $F(1, 87) = 3.83$, $p < .05$. As expected, these main effects were qualified by a significant Mood × Target Race interaction, $F(2, 87) = 10.03$, $p < .0001$. Analyses of simple effects revealed that the mean for the positive mood and the African American target race condition was significantly different from all other means (all $ps < .01$). No other tests approached significance.

Analysis including expertise as an independent variable showed, as expected, that false alarm rates of high experts were significantly lower than those of low experts, $F(1, 84) = 10.50$, $p < .002$. Expertise did not interact with other independent variables. The

[6] We found that more names were "known" than "remembered" when false alarm rates were analyzed, $F(1, 87) = 86.94$, $p < .0001$. No other effect was significant. This suggests that the basis of false alarm rates was familiarity of the names, regardless of the manipulated conditions.

[7] As in Experiment 2, the analyses were first conducted including participant gender and race each as an independent variable. Participant gender produced a significant main effect on both hit and false alarm rates, $F(1, 84) = 22.65$, $p < .0001$, and $F(1, 84) = 5.32$, $p < .03$, respectively. The female participants showed both lower hit rates ($M = .39$) than male participants ($M = .63$) and higher false alarm rates ($M = .09$) than male participants ($M = .05$). Again, this gender difference appeared to be a function of greater male expertise, with a ratio of 6:4 male to female experts. When expertise was added to the ANOVA model, the main effect of participant gender was completely removed, indicating that the effect of gender was in fact the effect of expertise. Consequently, participant gender was dropped from the analyses presented here, while expertise continued to be incorporated.

Table 2
Mean Hit and False Alarm Rates by Mood Condition, Race of Target, and Expertise Level of Participants (Experiment 3)

	Mood																	
	Negative (n = 30)						Neutral (n = 30)						Positive (n = 30)					
	HE (n = 12)		LE (n = 18)		Overall		HE (n = 17)		LE (n = 13)		Overall		HE (n = 14)		LE (n = 16)		Overall	
Rates	*M*	*SD*	*M*	*SD*	*M*	*SD*	*M*	*SD*	*M*	*SD*	*M*	*SD*	*M*	*SD*	*M*	*SD*	*M*	*SD*
Hit																		
White	.67	.22	.38	.16	.50	.23	.79	.19	.22	.17	.54	.34	.71	.26	.38	.24	.53	.31
Black	.61	.23	.39	.15	.47	.19	.74	.18	.22	.12	.51	.30	.65	.23	.39	.18	.51	.24
False alarm																		
White	.04	.11	.06	.06	.05	.08	.04	.06	.10	.10	.06	.08	.02	.03	.09	.10	.06	.08
Black	.03	.08	.05	.07	.04	.07	.04	.06	.06	.07	.05	.06	.09	.10	.17	.07	.14	.09

Note. HE = high experts; LE = low experts.

absence of a three-way interaction of Mood × Target Race × Expertise shows that both high experts and low experts demonstrated a similar response pattern in false alarm rates, as presented in Table 2. Similar to the finding obtained in Experiment 2, both high and low experts were more predisposed to judge in a stereotypic manner when in a positive mood.

As in Experiment 2, we computed signal detection statistics. Figure 4 presents the mean values of d' and Figure 5 presents those of log β. As before, the effects of participant gender were tested before other analyses were performed.[8]

Results for d'. The results for d' indicated that participants were less sensitive in distinguishing between basketball players and nonbasketball players when they judged African American names compared with when they judged European American names, $F(1, 87) = 5.21$, $p < .03$. However, this main effect was qualified by a significant Mood × Target Race interaction, $F(2, 87) = 4.23$, $p < .02$, showing that sensitivity was poorer when African American names were judged in the positive mood condition. Again, analyses of simple effects showed that the mean in the African American positive mood condition was significantly lower than all three other means (all $ps < .01$).

High experts were better able to discriminate basketball players from nonbasketball players, $F(1, 84) = 99.12$, $p < .0001$. Replicating the results from Experiment 2, the three-way interaction of Mood × Target Race × Expertise was not significant, indicating that both high and low experts in the positive mood condition were less sensitive in discriminating basketball players from nonbasketball players when judging Black names.

Results of log β. Analyses of log β showed a significant main effect of mood, $F(2, 87) = 7.09$, $p < .002$, with simple effects showing use of a substantially higher criterion in the negative mood condition ($M = 1.78$) than in the positive mood condition ($M = .95$, $p < .01$) and in the neutral mood condition ($M = 1.25$, $p < .05$). That is, negative mood led participants to set a stricter criterion in judging names. The difference in log β between positive and neutral mood conditions was not significant. As before, we found that a Mood × Target Race interaction was significant, $F(2, 87) = 4.03$, $p < .03$, with simple effects showing that a lower criterion was used when judging African American names by participants in a positive mood.

Expertise produced a significant main effect, $F(1, 84) = 4.10$, $p < .05$, with data of high experts showing use of a higher (stricter) criterion in judging names to be basketball players. In addition, the main effect of mood was significant, $F(2, 84) = 7.23$, $p < .002$. Simple main effects showed that both high and low experts set higher criteria in the negative mood conditions ($M = 1.92$ and 1.69, respectively) than in the positive mood conditions ($M = 1.29$, $p < .01$, and $M = .60$, $p < .001$, respectively) and in the neutral mood conditions ($M = 1.34$, $p < .01$, and $M = 1.11$, $p < .01$, respectively). As before, the criterion effect produced by positive mood was driven by low experts only. A Mood × Target Race × Expertise interaction without the negative mood condition was not significant.[9]

The results of Experiment 3 provided additional evidence that positive mood increases stereotype use such that more Black names were falsely identified as basketball players.[10] In addition, the results for the positive mood condition replicated the results obtained in Experiment 2 by demonstrating that stereotyping occurred because happy participants (a) were significantly less able to distinguish basketball players from nonbasketball players when judging Black names (sensitivity stereotyping) and (b) used a less

[8] Participant gender again showed a significant main effect on d', $F(1, 84) = 22.07$, $p < .0001$, showing that male participants ($M = 2.27$) were more sensitive than female participants ($M = 1.30$) in discriminating basketball players from nonbasketball players.

[9] However, when the three-way interaction was tested after combining the data from Experiments 2 and 3, it was significant, $F(1, 124) = 4.49$, $p < .05$, suggesting lower power.

[10] As before, we analyzed the frequency with which each stimulus name of nonbasketball players was falsely identified. The mean frequency of African American and European American names misjudged as names of players was 7.9 (ranging from 3 to 14) and 4.6 (ranging from 1 to 11), respectively. No single name was identified with unusually high frequency in either category. In addition, we calculated for each stimulus name the percentage of participants who judged it to be a White or Black name. Eighty-four percent of Black names were judged as such (players, 86%; nonplayers, 82%) and 86% of White names were judged as such (players, 84%; nonplayers, 88%). As in Experiment 2, these findings confirmed that the manipulation of ethnicity of names was successful.

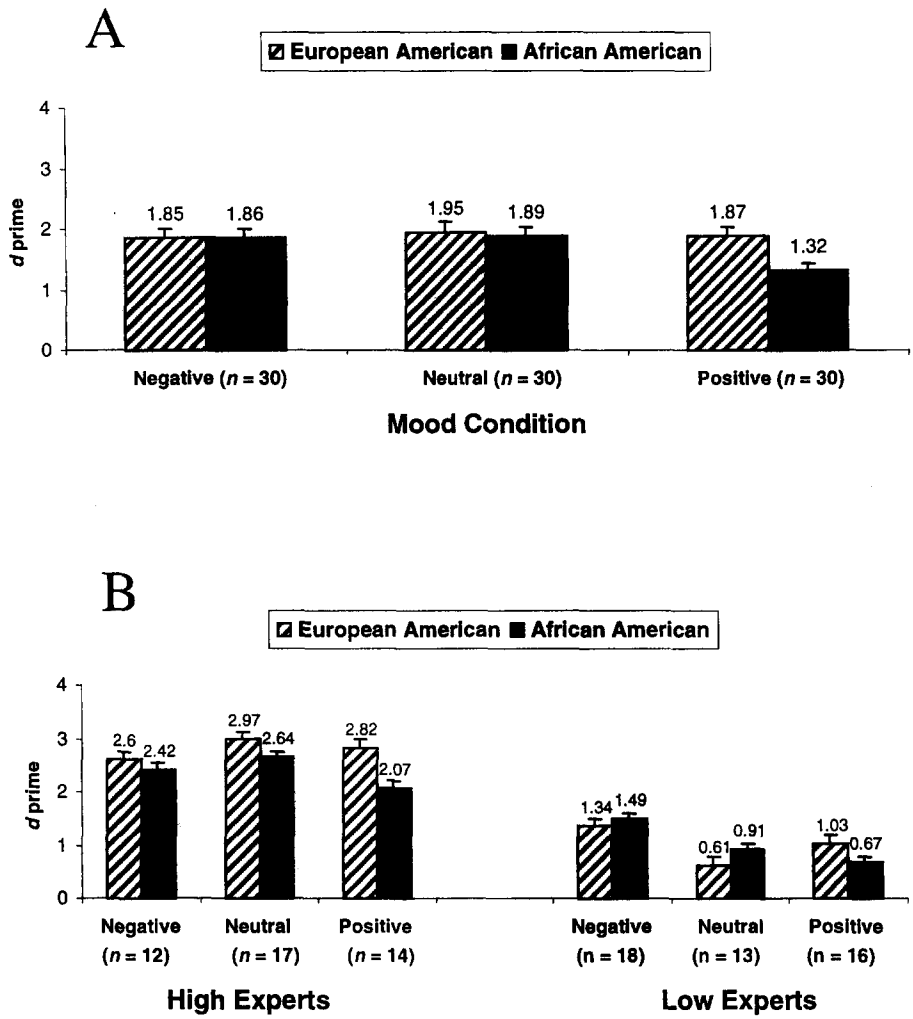

Figure 4. *d* prime as a function of mood and target race (A) and as a function of mood, target race, and expertise (B) in Experiment 3 (N = 90).

strict criterion when judging Black names than when judging White names (criterion stereotyping). These findings were obtained using a new mood manipulation, showing that on this dimension as well, these findings are quite robust.

The results of Experiment 3 also distinguished between the effects of positive and negative mood states. Being in a negative mood, unlike being in a positive mood, did not reduce sensitivity when judging African American names; the data in the negative mood condition were comparable to those in the neutral mood condition. More dramatically, negative mood had a tempering effect on criterion stereotyping compared not only with positive mood but also with neutral mood. Sad participants (negative mood) used a more stringent criterion for judging both Black and White names than did those in a positive or neutral mood. Sad participants set a strict criterion for player judgment, irrespective of group membership. These results point to negative mood's unique mode of influence on judgments largely through criterion shifts. If more conservative, less risky decisions are a hallmark of negative mood, it may well be the case that the cognitive strategy that maximizes that outcome best is to use a strict criterion that minimizes false alarms. The nature of bias effects in priming and other memory phenomena is currently under debate (see Bowers, 1999; Ratcliff & McKoon, 1997), and at present this discussion about its role in mood effects remains necessarily speculative.

General Discussion

In three experiments, we examined how mood states influence the propensity to use heuristics in judgment, in particular, stereotypes of social groups. Two mechanisms by which stereotypes influence judgment (sensitivity and bias) were identified, and the influence of mood on each was investigated. Several findings of interest emerged, and we summarize the core results across experiments as we discuss their implications for theory and application.

As predicted by several theories (cognitive capacity, mood-as-information, and mood-and-general-knowledge), positive mood did produce a heightened reliance on beliefs about the group in judging individual members. The probability of judging a person to be a criminal, politician, or athlete was increased when such judgments were made in a positive mood (compared with baseline)

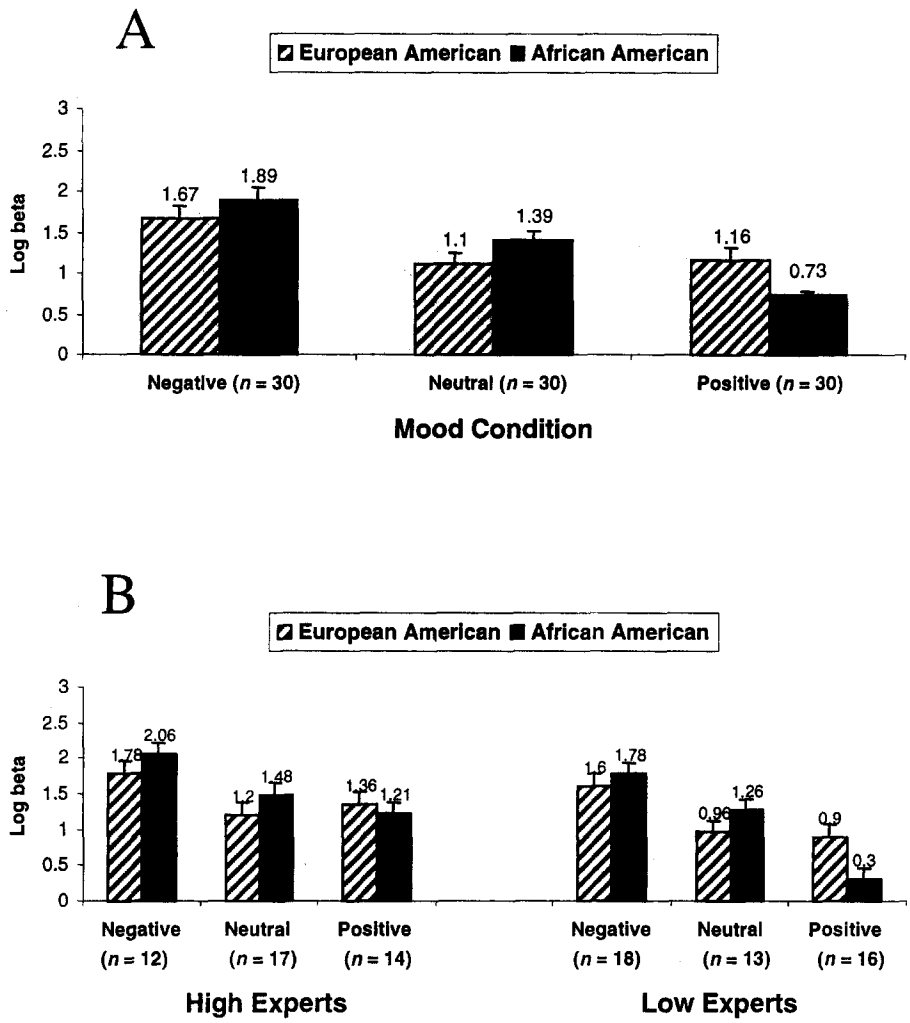

Figure 5. Log β as a function of mood and target race (A) and as a function of mood, target race, and expertise (B) in Experiment 3 ($N = 90$).

and when the targets of judgment belonged to the stereotyped group. That is, positive mood increased the likelihood that African Americans were falsely "remembered" to be criminals (Experiment 1) or athletes (Experiments 2 and 3), and by comparison, it increased the likelihood that European Americans were falsely "remembered" to be politicians (Experiment 1). This effect was robust and reliable, and it emerged under conditions of mild positive mood and on a category judgment task that was undemanding. This effect was also quite general—it was obtained with three different types of judgments involving two social groups, using both positive and negative dimensions of assessment.[11] It appears that mood effects may be particularly easy to obtain on tasks that are flexible in the sense that many social judgments are—decisions that are made under uncertainty. In our own preliminary work, similarly constructed mood states did not influence judgments that were less flexible, such as automatic stereotypes obtained with procedures that mimic semantic priming (e.g., Banaji & Hardin, 1996; Blair & Banaji, 1996).

To comprehensively analyze mood effects on stereotyping obtained in these experiments, we combined and compared the results across all three experiments, and calculated effect sizes of positive and negative moods on the dependent variables. As presented in Table 3, the positive mood condition generally produced strong effects on the main dependent variable measure. Using criteria provided by Cohen (1988), we found that more than half the effect sizes (58%) were over .8 (i.e., large effects) and almost all effects (96%) were over .5 (i.e., medium effects). The consistency and strength of effect sizes across three experiments suggests that positive mood reliably and robustly influences stereotyping. On the other hand, the effect sizes for negative mood were smaller, except on log β, on which negative (sad) mood significantly

[11] It might be argued that greater misidentification of Black names under happy mood conditions is attributable to the fact that positive mood increases the motivation to be productive. To test this idea, an analysis was conducted by comparing the overall number of identifications between mood conditions. However, we found no significant differences between mood conditions in the actual number of identifications in any of the three experiments (all $Fs < 1.5$).

Table 3
Effect Size Estimates (Cohen's d) of Positive and Negative Moods

Dependent variable	Mood × Target Race	Black–White	Positive–Neutral
False alarm rates			
Experiment 1			
Criminal judgment	0.65	1.64	0.93
Politician judgment	0.55	−1.49	0.81[a]
Experiment 2	1.14	1.48	1.21
Experiment 3	0.98	1.23	1.38
Negative mood effect size	0.00	−0.15	−0.15[b]
d'			
Experiment 2	.55	−.88	−.73
Experiment 3	.60	−.95	−.98
Negative mood effect size	.12	.01	−.05[b]
Log β			
Experiment 2	.54	−.47	−.59
Experiment 3	.70	−.59	−.91
Negative mood effect size	.09	.30	.69[b]

Note. Black–White refers to the simple effects of target race in the positive mood condition; Positive–Neutral refers to the simple effects of positive mood in the Black target race condition.
[a] Positive–Neutral simple effect in the White target race condition. [b] Negative–Neutral simple effect in the Black target race condition.

decreased reliance on heuristics compared with baseline. It may well be the case that such an effect was detected here because of the ability to separately observe the bias component of memory and judgment. Because this effect is among the largest obtained in these experiments and is the first such demonstration, the finding suggests a greater future role for examining the protective effect of sad mood on the use of heuristics.

In these experiments, positive mood did not produce congruence effects (i.e., more favorable judgments under happy mood). Nor did a happy mood increase the frequency of responding to all targets. Rather, the effect of happy mood was a focused one—it increased the likelihood that Tyrone (not Tim) would be falsely judged to be a criminal, that Jamal (not Jack) would be misidentified as a basketball player, and that Allen (not Ahmed) would be mistaken for a politician. We worked with a task known to reveal a strong stereotyping effect in a baseline mood condition, thereby reducing the chance of observing an increase in stereotype use in positive mood. Nevertheless, the presence of a mood-stereotyping effect in all three experiments and in four separate instances shows the effect to be palpably present and strong (see Table 3).

Theories of mood and cognition offer speculations about why it is that positive mood may produce this effect. We relied primarily on Schwarz's (1990) mood-as-information account and the related mood-and-general-knowledge idea (Bless, Clore, et al., 1996), which explicitly state that happy moods signal a safe environment leading to a lowering of one's psychological guard and resulting in greater reliance on heuristics. With that as the theoretical backdrop, we asked the question, How does mood produce this influence on judgment? We reasoned that a happy mood would blur otherwise clearer distinctions between signal and noise (e.g., "criminal" vs. "not criminal") and that positive mood should therefore show a reduction in sensitivity in perception and memory. Two experiments demonstrated this effect (Experiments 2 and 3) and they are the first to implicate reduction in sensitivity (*d'*) as one path by which positive mood's reliance on heuristics may be revealed. We were fortunate to be able to achieve a match in the fame of Black and White players while maintaining ethnicity distinctions. This allowed us to interpret not only the greater false alarm rate of Black names in a positive mood, it also allowed us to interpret the difference in sensitivity between the two social groups as reflecting a genuine difference in accuracy. This finding of sensitivity stereotyping is consistent with Bless, Clore, et al. (1996) who found higher intrusions rates (i.e., false alarms) among happy participants, but computations of accuracy (*d'*) are not available in that research for comparison.

A second and independent mechanism by which stereotypes may be deployed is through the use of a differential criterion in judgments that depend on social category knowledge. Experiment 1 showed higher false identification of Black Americans under a positive mood, but that experiment did not contain the appropriate conditions to test differences in bias or criterion (i.e., items that provided hits in addition to false alarms were not available). Experiments 2 and 3 were both designed to provide such an opportunity, and they are the first to show that positive mood increases stereotype use via an alternative path as well—by systematically lowering the subjective threshold when judging individuals who belong to the stereotyped group. Thus, both by reducing the ability to distinguish signal from noise when judging members of stereotyped groups and by invoking a more relaxed criterion for judging such individuals, participants in a positive mood differed from baseline in the degree to which they relied on heuristics.

Experiments 2 and 3 also illuminate the role of expertise in mood-stereotyping effects. Other investigators have attempted to create conditions in which the effects of positive mood on stereotyping could be attenuated or removed. For example, Bodenhausen, Kramer, and Susser (1994) used an accountability instruction and showed that the greater reliance on stereotypes under positive mood was indeed removed by requiring greater accountability. In the present experiments, no explicit intervention such as accountability was used. Instead, we were able to test if merely being an expert creates conditions for greater "cognitive accountability." We were able to examine whether greater knowledge about a topic leads to greater accuracy in social judgment. In particular, does expertise in a domain increase "mental due process," as Banaji and Bhaskar (1999) have termed the fairness procedures of interpersonal judgment?

We entertained the hypothesis that experts would not succumb easily to the deleterious effects of mood because expertise ought to provide not only superior knowledge but also greater confidence in judgment and this could bolster the use of more stringent judgment criteria. Our expectation was supported by research showing that experts are faster and show greater accuracy in recognizing a variety of information (e.g., face, visual word, tonal sequence; see Gauthier & Tarr, 1997; Gauthier, Williams, Tarr, & Tanaka, 1998; Lewellen, Goldinger, Pisoni, & Greene, 1993; Lively, Pisoni, Yamada, Tohkura, & Yamada, 1994).

Counter to expectation and evidence, however, both Experiments 2 and 3 showed that expertise did not guard against reduction in sensitivity under a positive mood, that is, both experts and nonexperts showed a decreased ability to separate signal from noise in a positive mood condition when judging members of a

stereotyped group (i.e., Black Americans). On the other hand, expertise did provide some buffering against heuristic use in general, with experts using an overall stricter criterion in judgment of both African and European names than nonexperts.

A final theoretical question raised by these experiments concerns the role of sad feeling states. Other research has demonstrated that sad mood does not produce the heightened reliance on stereotypes compared with positive mood and often does not differ in its effects from baseline mood (Bodenhausen, Sheppard, & Kramer, 1994). However, theories of mood and cognition have suggested the additional possibility that sad mood may actually reduce reliance on heuristics by urging a more careful, detail-oriented judgment strategy (Schwarz, 1990), and in these experiments, we found support for this proposal. On the measure of bias or criterion, participants in a sad mood set a stricter criterion for judgment than those in a positive or neutral mood. Such an obvious benefit of sad mood was not observed in the measure of sensitivity, in which sad participants showed superior ability to discriminate compared with happy participants, but they did not differ from those in a neutral mood. Sad moods may most sharply influence judgments by setting strict subjective criteria for judgment. The process underlying this finding reveals the possibility of a more careful, risk-averse decision strategy as a feature of sad moods.

The findings regarding sad mood appear to contradict others that suggest that such moods exacerbate stereotyping (Esses & Zanna, 1995). In Esses and Zanna's (1995) experiments, participants in a sad mood were more likely to evaluate social groups negatively. Such findings are not necessarily contradictory to the present ones, if attention is paid to the processes that each procedure taps. It is quite possible that sad moods do indeed produce a mood congruence effect such as the one observed by Esses and Zanna when the judgment involves evaluating social groups as units (Does group *X* have property *Y*?). In fact, even as the present experiments showed, participants in a sad mood did indeed produce more pessimistic estimates of life events (e.g., economy, marriage) compared with those in a positive mood. However, the main dependent measures used in the present experiments operationalized stereotyping as the use of general rules about social groups (Many *X*s are *Y*) in judging individuals (X_i is *Y*) and here, the findings do reveal a more careful use of group knowledge to judge individuals in a sad mood. The combination of findings that indicate that sad moods can exacerbate group-level evaluations but reduce the application of group-level evaluations to individual judgment should not be viewed as contradictory, but rather as revealing the unique effects of mood on differing underlying judgment processes. However, such seeming discrepancies warn against the broad usage of terms such as "stereotyping" without adequate specification of the processes that are invoked.

Because of the robustness and reliability of the results of Experiments 2 and 3 pertaining to sensitivity and bias measures, the generalizability of the findings to other social groups and dimensions of judgment is worth considering. Conservatively, we predict that similar effects of mood on sensitivity and bias might have been obtained in Experiment 1 as well, if conditions had permitted such tests. In that experiment, testing judgments of criminality, positive mood could have systematically distorted the ability to accurately distinguish signal from noise in a judgment with serious social consequences for the individual who is judged and for a society that aspires to fair decision making. It may be argued that because only social category information about targets was available in these studies, the findings may not generalize to situations in which individuating information is provided as well. Although that may well be the case, we emphasize that the procedures used in these experiments, by focusing on situations in which no individuating information is available, are not peculiar artifacts of laboratory design unlikely to find parallels in the world at large. As examples, we point out only two types of decisions that are repeatedly making the news these days: the decisions based on race/ethnicity that cab drivers routinely make about whether to stop for a client, and the decisions that police officers make about whether to stop a driver. Both types of "real" decisions carry enormous individual, social, and political consequence, and they are made with no individuating information and minimal group-level information.

Although we have focused almost exclusively on the theoretical aspects of mood and stereotype use, these findings also have implications for questions of social justice (see Banaji & Bhaskar, 1999). In general values and principles, civilized societies hold strongly to the view that assessments of a person (Is *X* a criminal?) ought to proceed independently of group membership (e.g., age, race, gender). Such a principle, although held to be self-evident, often requires articulation, if for no other reason, because the histories of all societies contain glaring evidence of the limits on equality and just treatment that arise from group membership. The role of social psychologists has been to untiringly reveal through experiments the contradiction between societal ideals of fairness, equality, and justice on the one hand, and individual expressions of thoughts, feelings, and action that reveal a starkly different mental and behavioral reality on the other hand. These experiments add to that body of research not only by showing that knowledge of social groups constrains the accuracy of social judgment, but also by specifically identifying that ordinary feeling states (transient happy and sad moods) can increase or decrease existing tendencies to rely on stereotypes often without perceivers' or targets' awareness or control (see Banaji, in press; Banaji & Greenwald, 1995; Banaji, Lemm, & Carpenter, in press; Greenwald & Banaji, 1995). Knowledge of these processes has obvious application in the many ordinary but influential situations in which those with and without expertise make judgments with far-reaching consequences about others. We stress the ordinary nature of the processes under investigation to emphasize that the implications of such results cannot be set aside as reflecting the peculiar actions of a unique group of individuals making unusual decisions. The feeling states we provoked were ordinary, the individuals we studied held beliefs that were ordinary, and the judgments they performed were ordinary. Yet, the confluence of mood and knowledge about social groups produced biases in judgment whose consequences could be quite extraordinary.

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Appendix A

Names Used in the Criminal and Politician Judgment Task (Experiment 1)

	Set A: African American Names	
DARIEN FREEMAN	LUTHER LYONS	JEROY PATTERSON
LEOTIS PAYNE	EPHRAIM PAYTON	PERCELL PINNOCK
DARNEL POWELL	REGGIE SCOTT	THEO THOMAS
FERRANTE TOWNS	EVEROL TUBBS	LEROY WASHINGTON
	Set A: European American Names	
MATTHEW ADAMS	CRAIG AKERS	GEORGE ALCORN
SEAN ALEEN	BILL ALLKING	JOE APPLEGATE
MIKE BEATTY	HENRY BOSTICK	JOSEPH BRUSH
RALPH BURKE	SCOTT CALVIN	JIM CARNES
JACK CONNELL	DENNIS CURBAN	WILLIAM DEITCH
TOM DRAKE	ROBERT FORBES	VICTOR GASTON
RICHARD GLICKMAN	KEVIN GOLDIN	GREG GOLDWATER
STEVEN GOLLINGER	ABRAHAM GREGORY	KEITH GRIESING
ERIC GRIFFIN	DAVE HALBROOK	MICHAEL HALLOWAY
TEDDY HAMMICK	BOB HOLMES	LEONARD JACOBS
DAVID JUNE	ROGER KRAUT	THOMAS LANDORF
STEPHEN LAWSON	ED LINDSAY	RICH LIVINGSTON
FRANK LOGAN	CURT LUCAS	ROB LUDGOOD
JAY MCBRIDE	GEOFF MCDONALD	JOHNNIE MERRITT
SAM MEYERS	TED MILLER	ANDY MILLTON
FRED MURRAY	HARRY NEWTON	PAUL O'GEROW
JOHN OLSON	ARTHUR PALMER	ART PAYNE
JEFF PENNEBAKER	STEVE PERLIN	JAMES PIERCE
ALLEN RICHARDS	RYAN ROGERS	BEN SIMMONS
DONALD SHIRLEY	BRIAN ST. JOHN	HARVEY STONE
DANIEL STUART	JASON UNDERWOOD	CHARLES WEISSING
ANDREW WELZ	PETER WHITTAKER	MARK WOLENC
TIMOTHY WOLF	GARY WOODSON	
	Set B: African American Names	
LEON BROWN	KENYON BURROUGH	TYRONE ELLIS
KARANJA JACKSON	JEROME KING	ALPHOSE MARTIN
LAMAR ROCHESTER	LAMONT SMITH	DWAYNE TOWNSEND
TERRELL TUCKER	JAMEL WILSON	TORRANCE WOODS

(Appendixes continue)

Appendix A (*continued*)

Set B: European American Names

MARTY ADAIR	ALBERT ALLEN	DOUG ANDERSON
JEFF AUSTIN	STEPHEN AYLWARD	MARK BALDWIN
JOHN BEASLEY	DONALD BERRY	MICHAEL BOX
AL BOYD	PATRICK BURKE	TOM BUTLER
ROBERT CHESTER	JOSEPH COE	WALTER COUNCIL
MIKE CROWLEY	JOE CURRAN	GREG DAVIS
ROBIN ELLSWORTH	HERBERT FIELDING	SAMUEL FOSTER
GEORGE FREDERIC	JAMES FULLER	WILLIAM GARDNER
FRANK GREGORY	STEVEN GRIESING	STANLEY GROVES
ARTHUR GUTHRIE	HUGH HALLOWAY	CHARLES HARRIS
THOMAS HINE	LYNN HOPKINS	DAVID IRWIN
SHAWN JEFFRIES	BRIAN KALIN	ROB KAPLAN
DAVE LADEN	ROGER LEBLANC	RICHARD LINDSEY
CHRISTOPHER LOTT	KEITH MACK	PAUL MADISON
CHRIS MALLORY	ANDREW MANNING	JASON MCCOY
ED MCLAIN	ERIC MEYERS	JIM MILLER
RON MILLS	PETER MORDIN	CURT MURRAY
GLENN NADEAU	VICTOR NELSON	KEN PRUTTING
HENRY REAVES	KERRY RICH	BILL ROBIN
RICK ROSENAY	THOMAS SAFFER	ALEX SCHMIDT
BRAD SCOTT	TODD SEALY	ADAM SHEPARD
SCOTT SILVER	STEVE STANCIL	GARY STAPLES
JERRY WILKERSON	BEN UNDERWOOD	

Appendix B

Basketball Player Judgment (Experiments 2 and 3)

African American Basketball Players

DARON BLAYLOCK	ANTOINE CARR	MAURICE CHEEKS
DARRYL DAWKINS	DEREK HARPER	TYRONE HILL
SHAWN KEMP	JAMAL MASHBURN	XAVIER MCDANIEL
ALONZO MOURNING		

African American Nonplayers

KENYON BURROUGH	LERONE GLOVER	KARANJA JACKSON
ALPHONSE MARTIN	JEROME MONROE	REGGIE NEWTON
LAMAR ROCHESTER	EVEROL TUBBS	LAMONT TURPIN
THEO THOMAS		

European American Basketball Players

DANNY AINGE	TOM CHAMBERS	MARK EATON
TONI KUKOC	CHRISTIAN LAETTNER	BILL LAIMBEER
KEVIN MCHALE	WILL PURDUE	RIK SMITS
BILL WALTON		

European American Nonplayers

JACK CONNELL	ERIC GRIFFIN	JOHN MERRITT
SAM MEYERS	FRED MURRAY	PATRICK ORR
ARTHUR PALMER	STEVE PEARLIN	HARVEY STONE
DAVID WOLF		

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