
Fear of the Dark: Interactive Effects of Beliefs About Danger and Ambient Darkness on Ethnic Stereotypes

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Two studies examined effects of ambient darkness and chronic beliefs about danger on activation of stereotypes about Blacks. Chronic beliefs were measured by a Belief in a Dangerous World (BDW) questionnaire. In Study 1, participants in either a dimly lit or dark room saw photos of Black men and rated the extent to which specific traits described the cultural stereotype of Blacks. In Study 2, participants in either a well-lit or dark room completed reaction-time tasks assessing implicit associations between Blacks and evaluative attributes. Separate measures assessed stereotypes connoting danger versus those that are merely derogatory. Results revealed BDW × Darkness interactions on activation of danger-relevant stereotypes: BDW positively predicted activation in dark but not in light conditions. It appears that chronic beliefs about danger can facilitate activation of functionally relevant stereotypes, but this effect occurs primarily under circumstances (such as darkness) that heuristically suggest vulnerability to harm. Conceptual implications are discussed.

Keywords: darkness; danger; fear; stereotype activation; stereotypes

A fearful reaction to dangerous things is one of the most fundamental of human experiences. The emotional experience of fear almost certainly has deep evolutionary roots and still serves the useful function of compelling individuals to vigilantly avoid those things—such as snarling bears, slashing blades, and speeding buses—that threaten their health. But that does not mean that these fearful feelings have only practical and prudent consequences. Far from it. Psychological, sociological, and anthropological studies imply that all sorts of unnecessary antisocial acts—from bullying to gang violence to tribal warfare—are precipitated by threat and perceived vulnerability to danger (Decker & Van Winkle, 1996; Dodge, 1980; Robarchek, 1990). The antisocial conse-

quences of threat can be very subtle; they include not just overt acts of aggression but also a variety of cognitive responses (e.g., Dodge & Somberg, 1987). In this article, we examine one particular type of antisocial cognition: derogatory ethnic stereotypes. We report two experiments revealing that chronic beliefs about danger interact with ambient darkness (an environmental context that connotes feelings of vulnerability) to influence the activation of those stereotypes.

Stereotypes and Prejudice as a Consequence of Specific Threats and Dangers

There is a substantial psychological literature exploring the ways in which a variety of fears and threats influence stereotypes and prejudice. The existential fear associated with knowledge of one's own mortality is known to have consequences on intergroup prejudice (Greenberg, Solomon, & Pyszczynski, 1997). Other research reveals that ego threat—challenge to one's self-esteem—facilitates the activation of negative ethnic stereotypes and increases outgroup prejudice (Brown, Collins, & Schmidt, 1988; Fein & Spencer, 1997). But these lines of inquiry do not address the specific sort of threat experience under inquiry here. Of greater relevance is

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research examining the effects of realistic threats (Stephan, Ybarra, Martinez, Schwarzwald, & Tur-Kaspa, 1998): the perception of some sort of material threat to the outcomes experienced by oneself or one's ingroup. This category of realistic threats is itself diffuse and comprised by several conceptually and phenomenologically distinct concerns, including concerns with status, political power, economic outcomes, and intergroup conflict. Plenty of research reveals that these sorts of concerns do indeed promote prejudice against ethnic outgroups (Campbell, 1965; Esses, Jackson, & Armstrong, 1999; Jackson, 1993; Sidanius & Pratto, 1993; Stephan, Diaz-Loving, & Duran, 2000). But these threats too are distinct from the sort of fearful experience that connotes personal vulnerability to actual physical danger. It is this singular type of realistic threat—and its effects on prejudice—that the present studies examine.

Anecdotal evidence—both historical and contemporary—indicates that feelings of vulnerability to physical danger can promote ethnic prejudice (Suedfeld & Schaller, 2002). This is evident in inquiries into White Americans' prejudices against African Americans and other peoples of darker skin. Schultz (1999) presents a set of historical studies that describe ways in which White Americans' prejudices against darker-skinned peoples in the 19th and 20th centuries were promoted by worries about the dangers posed by those peoples. The same linkage is evident today on the World Wide Web sites maintained by organizations devoted to White supremacy and/or racism, on which dark-skinned peoples are regularly alleged to constitute threats to White individuals' health and well-being.

There is also some psychological evidence linking this specific form of perceived threat to ethnic prejudice. Non-Black individuals experience heightened levels of threat-relevant physiological reactions in the presence of unfamiliar Black men (Blascovich, Mendes, Hunter, Lickel, & Kowai-Bell, 2001; Phelps et al., 2000). Moreover, these physiological reactions to Blacks also predict anti-Black prejudice. Phelps et al. (2000) found that White individuals with the strongest amygdala responses to Black faces—an indicator of fearful emotional reactivity—also tended to show stronger evaluative associations favoring Whites over Blacks (as measured by the Implicit Associations Test) (Greenwald, McGhee, & Schwartz, 1998). These findings suggest that, at some level, individuals perceive specific ethnic outgroups as sources of potential danger and that this perceived danger is linked to the prejudices they experience and express.

Stereotypes and Prejudice as a Result of Nonspecific Beliefs About Danger

Of course, not all perceptions of danger are associated with specific ethnic outgroups. Some people simply

feel more vulnerable to interpersonal dangers than others. Are people who feel more vulnerable to harm in general also more prejudiced against ethnic outgroups? And if so, when? And why?

Some preliminary answers to these questions have emerged from research on the authoritarian personality. Conceptual analyses of authoritarianism implicate fearfulness as one of several key constructs that contribute to this multifaceted personality syndrome (Adorno, Frenkel-Brunswik, Levinson, & Sanford, 1950; Stone, Lederer, & Christie, 1993; Suedfeld & Schaller, 2002). Within this conceptual context, Altemeyer (1988) examined nonspecific beliefs about physical danger and its relation to ethnic prejudice. Altemeyer (1988) developed an individual-difference measure of chronic beliefs about interpersonal dangers in the world and tested the extent to which this Belief in a Dangerous World Scale correlated with overt expressions of prejudice against a variety of outgroups. Results from several studies revealed positive correlations: Those individuals who most strongly believed in a dangerous world also tended to most strongly express overt prejudices.

There are limits to the conclusions that can be drawn from those results. Some of the limits come into sharper focus when we consider more deeply the psychological steps that precede overt expressions of prejudice (Devine, 1989). Upon perceptually encountering a member of any ethnic outgroup, specific stereotypic perceptions of that group may (or may not) be automatically activated into working memory; if activated, controlled processing dictates whether these stereotypic perceptions are (or are not) manifested in judgments, behaviors, or other overt expressions of prejudice. Both the automatic and controlled steps in this chain of psychological events may be influenced by specific aspects of the immediate context (Gilbert & Hixon, 1991; Sinclair & Kunda, 1999). Stereotypic perceptions may be activated in some contexts but not in others. Stereotypic perceptions that are active in working memory may be expressed in some contexts but not others. These considerations suggest a couple of necessary directions for further inquiry.

First, to understand the manner in which beliefs about danger influence prejudice, it is important to examine the effects on specific steps in the prejudice process. The two studies reported in this article focus on the first step. The methods were designed to assess the extent to which certain stereotypic perceptions become activated into working memory. Different methods of assessing stereotypic perceptions are used across these two studies, and each provides the opportunity to examine the extent to which these stereotypic perceptions are related to chronic beliefs about a dangerous world.

Second, if we are to completely understand the relation between beliefs about danger and the activation of ethnic stereotypes, we must consider specific elements of the immediate context. Just as contextual variables can exert main effects on certain aspects of stereotypic perception, so too do they importantly moderate the effects of personality variables (e.g., Khan & Lambert, 2001; Schaller, Boyd, Yohannes, & O'Brien, 1995). What sorts of contextual variables might moderate the influence of beliefs about danger on the activation of ethnic stereotypes? One possibility is this: The influence might differ depending on the extent to which the immediate circumstances connote danger. The present studies focused primarily on one particular environmental circumstance that has not previously been studied in this literature: ambient darkness.

The Triggering Effects of Ambient Darkness

Human beings attach symbolic meaning to lots of different things, and many of these meanings are culture specific. But certain symbolic associations are remarkably universal, and one of the most striking of these cultural universals is the symbolic meaning attached to darkness. To peoples everywhere, darkness connotes evil, threat, and danger.

This symbolic association has psychological consequences. People who clothe themselves in black uniforms are more likely to act in harmful ways (Frank & Gilovich, 1988). The symbolic associations with darkness also may contribute to the tendency, found in many cultures, to favor lighter-skinned peoples over those with darker skin (Iwawaki, Sonoo, Williams, & Best, 1979). Of course, darkness is not merely a characteristic describing clothing or skin tone; it is a thing itself. The darkness that most directly connotes danger and arouses fear is a physical circumstance: the dark of night, the absence of ambient light.

Thus, whereas ambient light may be reassuring, ambient darkness can arouse fear and may lead individuals to respond to others in fearful ways. Indeed, darkness has been shown to increase the magnitude of the acoustic startle reflex (Grillon, Pellowski, Merikangas, & Davis, 1997) and to facilitate aggression against other individuals (Page & Moss, 1976). It seems likely that darkness may cause dispositionally wary individuals to be even warier of potential dangers in the world. This has implications for the prediction of ethnic stereotypes. If non-Black perceivers—perhaps especially those who are dispositionally wary—implicitly associate Blacks with danger, then ambient darkness may dispose these individuals to perceive Blacks in especially dangerous ways. In a sense, ambient darkness may “trigger” the latent tendency for negative ethnic stereotypes to spring to mind among those who chronically believe the world is dangerous.

Expressed more formally, this conceptual analysis implies that chronic beliefs about danger and ambient darkness may interact in predicting the activation of derogatory ethnic stereotypes: The relation between belief in a dangerous world and stereotype perception may be strongly positive in the dark but weaker in the light.

The two studies reported here examined the joint effects of ambient darkness and chronic beliefs about danger on non-Black individuals' stereotypic perceptions of Blacks. In both studies, belief in a dangerous world was assessed, ambient darkness was manipulated, and additional methods measured the extent to which specific derogatory traits were stereotypically associated with Blacks.

STUDY 1

After completing a measure of chronic beliefs about danger—Altemeyer's (1988) Belief in a Dangerous World questionnaire—participants were presented with a slide show designed to make Blacks perceptually salient. To manipulate ambient darkness, this slide show occurred in either a dimly lit room or in near-total darkness. A second manipulation was also included: the demeanor (smiling vs. scowling) of the Black individuals depicted in the slide show. It was anticipated that scowling faces might serve as a cue signaling harmful intent and, if so, might predict stereotype activation in a manner similar to ambient darkness. After the slide show, indirect measures of stereotype activation were assessed, allowing separate examination of the activation of highly danger-relevant stereotypic traits and less danger-relevant stereotypic traits.

Method

PARTICIPANTS

Ninety-two undergraduate students participated voluntarily in exchange for extra credit in 1st- and 2nd-year psychology courses. They participated in small gatherings of up to 10 persons per experimental session (median *N* per session was 7.0). Sixty-seven participants were women and 25 were men. Fifty-three participants were of East Asian heritage, 31 were of European heritage, and 8 were of various other ethnic backgrounds; none were Black. Participants in each session were assigned to one of four experimental conditions according to a predetermined randomized block procedure (*N*s in experimental conditions varied between 21 and 26).

PRELIMINARY MEASURES

Participants were seated in a windowless room that was well-lit by electric fluorescent lights. They were informed that the experiment was designed to examine

the manner in which person perception related to other aspects of cognitive processing. In a cover story consistent with the procedures that followed, participants were told they would be shown a slide show portraying individual musical artists who worked within a specific category of music and occasionally would complete tasks designed to measure specific cognitive processes.

Following this overview, participants completed several questionnaires, among which was located a 12-item Belief in a Dangerous World Scale (BDW) (Altemeyer, 1988, pp. 195-196). The BDW questionnaire includes 6 positively worded and 6 negatively worded statements concerning the dangers lurking in the social world (e.g., "Every day, as our society becomes more lawless and bestial, a person's chances of being robbed, assaulted, and even murdered go up and up"); participants rated their agreement with each statement on 7-point scales. An overall score was computed by reverse scoring ratings on the 6 negatively worded items and then computing mean ratings across all 12 items to form a single BDW index (Cronbach's $\alpha = .78$).

Participants then completed a word-stem completion task in which they were presented with 15 word fragments (e.g., BO__, CRA__) and asked to write down words that completed the fragments. Responses to this task were of no conceptual interest; its purpose was simply to familiarize participants with word-stem completion procedures used in a later measure.

SLIDE SHOW MANIPULATION

Depending on experimental condition, participants watched one of two different slide shows. Both slide shows consisted of nine photos of individual young African American men, projected by a carousel projector onto a blank wall of the room. The two slide shows differed in terms of the facial expressions of the nine men featured. One show (consisting of photos taken primarily from jazz music magazines) featured nine smiling Black men. The other show (consisting of photos taken from rap music magazines) featured nine scowling Black men.

DARKNESS MANIPULATION

Depending on experimental condition, participants were presented with the slide show under conditions of either dim lighting or near-total darkness.

In the light condition, the experimenter turned off the overhead lights prior to starting the slide show but left open a door to an adjoining well-lit room. This provided lighting dim enough for excellent slide projection but there was still considerable ambient light in the room. After dimming the room, the experimenter waited 10 sec prior to turning on the projector and presenting the first slide. (Participants were told that this 10-sec wait would provide them some time for their eyes to

adjust to the change in lighting.) Each slide in the slide show was presented for 6 sec, separated by 4 sec of blank screen (illuminated brightly by the lamp from the projector) between each slide. After the slide presentation, the room lights were turned on to full brightness.

In the dark condition, the experimenter turned off the room lights and closed the door to the adjoining room. This left the room in total darkness for 10 sec prior to the start of the slide show. (These participants too were informed that this 10-sec wait would provide an opportunity for their eyes to adjust.) Each slide in the slide show was presented for 6 sec. The lamp on the slide projector was turned off during the 4-sec interslide interval (thus ensuring that each of the nine photos was encountered within a context of total darkness). After the slide presentation, the room lights were turned on to half-brightness for the remainder of the experimental session.

MEASURES OF STEREOTYPE ACTIVATION

Immediately following the slide show, participants were given another word-stem completion task. This task included 20 word stems. Ten word stems were designed in such a way that they could be completed with words connoting danger: AGG__, CRI__, DANG__, FEA__, HAR__, HOS__, HUR__, MEA__, THRE__, VIO__. Ten other stems were designed in such a way that they could be completed with words commonly associated with the stereotype of Blacks but which are not particularly relevant to danger: ATH__, BR__, BRO__, LA__, LOU__, MU__, MUS__, POO__, RH__, STU__. The word stems were presented on a single sheet in alphabetical order. Participants were instructed to "write down the first word that comes to your mind that completes the stem, as quickly as possible." They were given 2 min to complete the task. Responses to this measure were scored by computing (a) the total number of danger-relevant word completions (e.g., *crime, danger*) in response to the 10 pertinent word stems and (b) the total number of stereotype-relevant completions (e.g., *athlete, broke*) in response to the other 10 word stems.

Participants then completed a trait-rating measure assessing their perceptions of the cultural stereotypes of Blacks that exist within North American culture. On a single sheet, they were presented with a list of 18 traits and were asked to rate (on a scale of 1 to 10) the "extent to which you perceive that this trait is part of the popular cultural stereotype of Blacks." Instructions emphasized that the purpose was not to assess participants' personal beliefs about the veracity of the stereotypes but simply to assess the extent to which each trait was part of the cultural stereotype. Seven of these traits directly connoted potential danger (*aggressive, untrustworthy, hostile, criminal, dangerous, combative, deceptive*). Seven other traits

TABLE 1: Experiment 1: Effects of Belief in a Dangerous World (BDW), Darkness, and Slide Show on Perceived Stereotypicality of Traits High and Low in Danger Relevance

Predictor	B	β	t	p
High danger-relevance stereotype index				
BDW main effect	.22	.14	1.29	.200
Darkness main effect	.16	.10	0.97	.335
Slide show main effect	.12	.08	0.75	.453
BDW \times Darkness interaction	.31	.20	1.83	.070
BDW \times Slide Show interaction	.24	.15	1.40	.166
Darkness \times Slide Show interaction	-.01	.00	0.04	.967
BDW \times Darkness \times Slide Show interaction	-.21	-.14	1.25	.215
Low danger-relevance stereotype index				
BDW main effect	.11	.08	0.66	.512
Darkness main effect	.04	.03	0.29	.772
Slide show main effect	-.02	-.02	0.15	.880
BDW \times Darkness interaction	.25	.18	1.58	.118
BDW \times Slide Show interaction	.02	.01	0.12	.907
Darkness \times Slide Show interaction	-.19	-.13	1.21	.229
BDW \times Darkness \times Slide Show interaction	-.22	-.15	1.36	.177

were evaluatively negative and have been commonly perceived to be stereotypical of Blacks (Devine & Elliot, 1995) but are less relevant to danger (*lazy, poor, ignorant, materialistic, superstitious, arrogant, gossipy*). (The 4 other traits were evaluatively positive and were not included in the analyses reported below.)

Results

Of the two measures included to assess activation of stereotypes, only the trait-rating measure produced clearly meaningful results. We present these results first.

RATED STEREOTYPICALITY OF TRAITS

Ratings on the seven highly danger-relevant traits were averaged to form a high danger-relevance stereotype index (Cronbach's $\alpha = .88$); ratings on the seven other negatively valenced traits were averaged to form a low danger-relevance stereotype index (Cronbach's $\alpha = .74$).

Statistical analyses on these indices were conducted with regression analyses. For initial analyses, values of -1 and 1 were assigned to the two levels of the manipulated darkness and slide show variables (light = -1, dark = 1; smilers = -1, scowlers = 1) and BDW values were transformed into z scores. Three additional predictor variables were then computed by taking the multiplicative products of each of the three pairs of these variables. These three new variables represented the BDW \times Darkness, BDW \times Slide Show, and Darkness \times Slide Show interactions. A final predictor variable was the multiplicative product of all three variables; this represented the three-way BDW \times Darkness \times Slide Show interaction. All

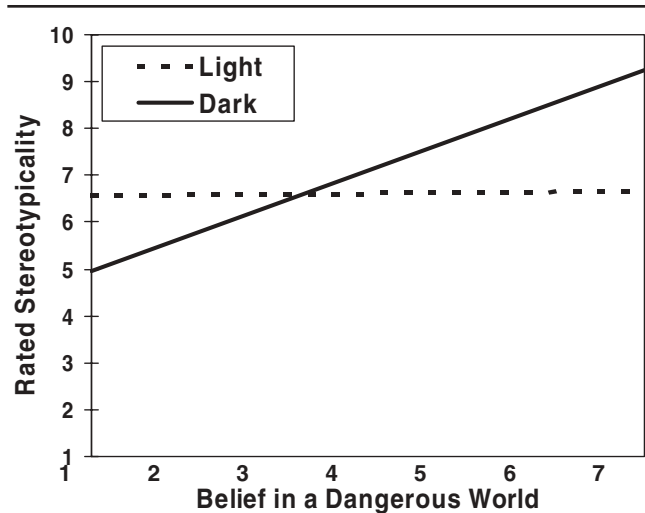


Figure 1 Study 1: Regression lines indicating the predictive effects of BDW on the high danger-relevance stereotype index, in the light and in the dark.

NOTE: BDW = Belief in a Dangerous World Scale.

seven predictors were entered simultaneously in a pair of regression analyses. In one analysis, the dependent variable was the high danger-relevance stereotype index. In the other analysis, the dependent variable was the low danger-relevance stereotype index. Results of both analyses are presented in Table 1.

Results on the high danger-relevance stereotype index reveal that neither BDW nor darkness had substantial main effects, but the BDW \times Darkness effect was of a magnitude that cannot easily be attributed merely to sampling error, $\beta = .20, p = .070$. (Unless indicated otherwise, the p values reported in this article are based on inferentially conservative, nondirectional—"two-tailed"—tests of null hypotheses. A directional test of the null hypothesis indicates that $p = .035$ for the specific BDW \times Darkness interaction effect observed here.) Separate correlations reveal that BDW did not predict responses on this high danger-relevance stereotype index among participants in the light condition ($r = .01, p = .963$) but did substantially predict responses among those in the dark condition ($r = .38, p = .012$). Figure 1 illustrates this interaction.

Weaker effects were observed on the low danger-relevance stereotype index (for the BDW \times Darkness interaction, $\beta = .18, p = .118$). Correlations with BDW were $r = -.06 (p = .682)$ in the light condition and $r = .23 (p = .134)$ in the dark condition.

The stronger effects on the high danger-relevance index cannot easily be attributed to differences in the overall prototypicality of the focal traits. Even though high danger-relevant traits were generally judged to be more stereotypical than low danger-relevance traits

(overall M s were 6.72 and 5.52 on the high and low danger-relevance indices, respectively), direct comparisons between similarly stereotypical traits revealed stronger effects on more highly danger-relevant traits. For instance, “ignorant” and “untrustworthy” were judged to be similarly stereotypical (overall M s were 6.23 and 6.03, respectively); however, the BDW \times Darkness interaction emerged on the latter ($\beta = .15$) but not the former ($\beta = .00$). Similarly, “poor” and “hostile” were judged to be similarly stereotypical (M s were 7.50 and 7.33, respectively), but the BDW \times Darkness interaction emerged more strongly on the latter ($\beta = .26$) than on the former ($\beta = .16$). The different effect sizes on high and low danger-relevance trait indexes also cannot easily be attributed to differences in affective valence. The traits “ignorant” and “hostile” are perceived to be equally negative (Rothbart & Park, 1986), but BDW \times Darkness effects occurred only on the latter.

Additional analyses explored the extent to which perceivers’ ethnicity or sex might moderate the effects of other predictor variables on the high danger-relevance stereotype index. Moderating effects of ethnicity were negligible but there were some interesting effects of sex. So, with the cautionary note that these analyses are best considered exploratory, we report these sex effects in a bit more detail. (Given the exploratory nature of these results, we report only those results for which $\beta > .20$ and $p < .05$.) For these analyses, values of -1 and 1 were assigned to the female and male participants, respectively, and interaction variables were computed in the manner described above. A regression analysis was then conducted that included 15 predictor variables representing the main effects and every interaction involving BDW, darkness, slide show, and sex. The BDW \times Darkness interaction, described above, remained a strong predictor ($\beta = .514, p < .001$). There emerged also a Sex \times BDW \times Darkness interaction ($\beta = .508, p < .001$). Follow-up analyses revealed that although the general nature of the BDW \times Darkness interaction was consistent across both men and women—there were more strongly positive effects of BDW in the dark than in the light—the magnitude of this interaction was greater among men. In addition, there emerged a Sex \times Slide Show \times Darkness interaction ($\beta = -.248, p = .022$). Among men, darkness triggered stronger danger-relevant stereotypes, regardless of whether the slide show featured smilers or scowlers; among women, darkness triggered stronger stereotypes only when the slide show featured scowlers.

WORD-STEM COMPLETIONS

The two word-stem indices were examined separately to assess any main effects or interaction effects of the primary independent variables (BDW, darkness, slide show). No clearly interpretable effects emerged. The

only effects of any note occurred on the danger-relevant word-stem measure. On this measure, the BDW \times Darkness effect was consistent with that on the danger-relevant trait-rating measure described above: BDW correlated more highly with danger-relevant completions in the dark ($r = .23$) than in the light ($r = -.06$). But this interaction effect was weak and an alternative explanation based on sampling error cannot be confidently dismissed ($\beta = .15, p = .177$). This effect was further qualified by a complicated three-way interaction between all three independent variables ($\beta = .20, p = .078$) that defied meaningful interpretation. Only trivial effects emerged on the low danger-relevance word-stem index (all p s $> .20$). None of these effects emerged more strongly when sex and ethnicity were included as additional predictor variables. In general, the word-stem completion task appeared largely insensitive to the effects that emerged on the trait-rating measure of perceived stereotypes.

Discussion

When photos of Black men were encountered under conditions of some ambient light, individuals’ beliefs about danger in the world did not predict their tendency to perceive Blacks in stereotypical ways. However, under conditions of ambient darkness, beliefs about danger were associated with a tendency for more derogatory stereotypes of Blacks to come to mind. This effect was most pronounced on measures designed to assess the activation of stereotypes that connoted danger. Effects on the activation of other (less danger-relevant) negative stereotypes were weak and appeared to be merely a secondary consequence of the more direct effects on highly danger-relevant stereotypes.

Of interest, these effects were stronger among men than among women. Previous research has indicated that men report higher levels of racism and ethnocentrism than women (Sidanius, Cling, & Pratto, 1991; Watts, 1996). The results observed here suggest that men may be more sensitive than women to variables that trigger the activation of racial stereotypes, specifically stereotypes connoting the threat of physical harm.

These results were observed clearly only on the trait-rating measure. Results on a different measure of stereotype activation—a word-stem completion task—were weaker. It is worth reflecting on the insensitivity of the word-stem completion task. Similar tasks have been used with some success as indicators of stereotype activation in other research (e.g., Sinclair & Kunda, 1999; Spencer, Fein, Wolfe, Fong, & Dunn, 1998; Steele & Aronson, 1995). One difference between those studies and the present one is the specific nature of the stereotypes that apparently were activated. The processes engaged in those other studies were not specific to danger-relevant

beliefs, and the word-stem tasks were designed to assess the activation of more benign thoughts. In the present study, the observed effects pertained to some fairly harsh beliefs, and participants may have deliberately avoided completing the word stems with words that they perceived to reflect negatively on their frame of mind (*danger, violent, etc.*). Indeed, some participants admitted this tendency when questioned during debriefing sessions. It may be that the trait-rating task offered a more sensitive measure of stereotype activation specifically because its instructions freed participants from self-consciousness about the meaning of their responses.

Another limitation of these results is that the methods assessed the extent to which traits were perceived as stereotypic of Blacks, period; they did not assess the extent to which these characteristics were more stereotypic of Blacks than non-Blacks. It is impossible to rule out the possibility that the same effects would have been found on perceptions of ethnic ingroups. Study 2 addressed this limitation by using a different method for assessing stereotype activation—one that measures the extent to which evaluative trait attributes are differentially associated with ethnic ingroups and outgroups. The experimental procedures used in Study 2 were different in several other ways as well, thus allowing more generalizable conclusions to be drawn.

STUDY 2

In Study 2, we used the Implicit Association Test (IAT) (Greenwald et al., 1998) to assess stereotype activation. The IAT is a computer-based response-time method that measures differential association of two social categories (e.g., Black/White) with some focal attribute (e.g., pleasant/unpleasant). The IAT is also less susceptible to some problems associated with explicit measures of attitudes (i.e., participants are less able to fake their responses on the IAT). The IAT has been used successfully to measure the activation of ethnic stereotypes that people are reluctant to explicitly acknowledge (Greenwald et al., 1998; Rudman, Greenwald, Mellott, & Schwartz, 1999). Responses on the IAT are sensitive not only to chronic differences in associative strength but also to temporary shifts in associative strength (Blair, Ma, & Lenton, 2001; Wittenbrink, Judd, & Park, 2001), and so it is a useful means of assessing the effects of contextual cues on stereotype activation.

Method

PARTICIPANTS

Fifty-two undergraduate students participated in exchange for course credit in 1st- and 2nd-year psychology courses. Forty-one participants were women and 11 were men; 26 were of East Asian heritage, 18 were of

European heritage, 2 were of both Asian and European heritage, and 6 were of various other ethnic backgrounds (none were Black).

PRETESTING AND SELECTION OF STIMULUS ITEMS

Forty additional participants in a preliminary study were given a three-part questionnaire consisting of a list of 50 words that typically have either positive or negative connotations (including words used in prior IAT studies such as Greenwald et al., 1998). First, participants rated on a 7-point scale the extent to which the words are associated with feelings of either unpleasantness or pleasantness (1 = *unpleasant*; 4 = *neutral*; 7 = *pleasant*). Second, they rated the extent to which the words are associated with feelings of danger and/or threat. Third, they rated the extent to which the words are associated with safety and/or security. (These last two ratings were made on 7-point scales with endpoints of 1 and 7 labeled *not associated* and *highly associated*.) The danger ratings were subtracted from the safety ratings to produce an index of danger-relevance, such that words that were perceived as connoting greater danger had more highly negative values, words that were perceived as connoting greater safety had more highly positive values, and words that were perceived as having little relevance for danger or safety had values closer to 0 (e.g., *murder* had a value of -5.48 , *secure* had a value of $+4.72$, and *lazy* had a value of -0.43).

On the basis of these pretest ratings, we selected stimulus words for two different IAT tasks. One IAT was designed to assess differential associations of ethnic groups with unpleasant/pleasant, and the other was designed to assess associations with danger/safety. For the unpleasant/pleasant IAT, we selected 10 words that were rated as strongly associated with either unpleasant (*dirty, failure, lazy, poverty, stink*) or pleasant (*intelligent, laughter, pleasure, rainbow, smart*) but that were not rated as highly associated with danger/safety. (Mean pleasantness ratings were 2.30 and 5.76 for the two sets of five words, respectively; *M*s on the danger/safety index were -1.52 and 2.26 , respectively.) For the danger/safety IAT, we selected 10 words that were just as strongly associated with unpleasant or pleasant but were more highly associated with danger (*aggressive, hurt, injury, pain, terrible*) or safety (*gentle, harmless, peace, secure, trust*). (Mean pleasantness ratings were 2.33 and 5.63, respectively; *M*s on the danger/safety index were -3.52 and 3.87 , respectively.)

IAT TASKS

Each IAT task presented participants with a series of forced-choice categorization trials, in which they responded by pressing either the *E* or *I* key on a computer keyboard (with their left and right index fingers, respectively). On each trial, a target stimulus (e.g., a

word) was presented in the center of the computer screen, with the two response option reminders (e.g., unpleasant and pleasant) indicated on the upper left and upper right sides of the screen. Participants were instructed to respond as quickly as possible by pressing the response key corresponding to the category associated with the target stimulus.

On the unpleasant/pleasant IAT, participants were presented with two different kinds of categorization trials. One type was a word categorization task: Participants judged whether words were unpleasant or pleasant. A second type was an ethnic outgroup/ingroup categorization task: Participants of Asian background judged whether faces were African or Asian and all other participants judged whether faces were African or European. (Faces in the African/Asian task were those of Blacks and Asians; faces in the African/European task were those of Blacks and Whites.) These categorization trials were presented across five distinct blocks, each of which was prefaced with a different set of instructions. The first block presented 20 word categorization trials, and the second block presented 20 face categorization trials. The third block presented 40 trials, randomly mixing word categorization and face categorization trials, in which unpleasant was paired with the same response key as the ethnic outgroup and pleasant was paired with the same key as the ingroup. Following another block of just 20 face categorization trials (in which the response keys associated with ingroup and outgroup were reversed), the fifth block presented 40 trials mixing word and face categorization trials. In contrast to the third block, unpleasant was paired with the same response key as the ethnic ingroup and pleasant was paired with the same key as the outgroup. Previous research (e.g., Greenwald et al., 1998) has shown that the difference in average response times to trials presented in Block 3 and Block 5 serves as an indicator of the extent to which the ethnic outgroup is differentially associated with the evaluative category unpleasant: Shorter response times at Block 3 relative to response times at Block 5 indicate stronger associations between Black faces and unpleasant characteristics.

The danger/safety IAT followed the same format, except that the stimulus words were those prerated to be highly relevant to either danger or safety, the response categories employed on the word categorization trials were labeled "danger" and "safety," and participants were instructed to judge whether words were danger words or safety words. The difference in average response times on Block 3 and Block 5 served as an indicator of the extent to which the ethnic outgroup is differentially associated with danger: Shorter response times at Block 3 relative to response times at Block 5 indicate stronger associations between Black faces and danger.

The two IAT tasks were presented sequentially, with no interruption from the experimenter. The order of the two tasks was counterbalanced across subjects.

IAT tasks were presented on an IBM-compatible computer through a program run on Inquisit software (Version 1.29). Participants viewed the display from a distance of approximately 60 cm.

PROCEDURE AND DARKNESS MANIPULATION

At the outset of the experimental session, participants were seated in a small room in front of a computer and were presented with a practice IAT to become familiar with the IAT procedure. (The categorization trials in this practice IAT involved pictures of flowers and insects and pleasant and unpleasant words; these words were different from those used in the unpleasant/pleasant IAT described above.)

Participants were then taken into a different room to complete a demographic questionnaire and two other questionnaires irrelevant to the focus of the present investigation. Upon completion of the questionnaires, participants were informed that they would be doing another IAT task shortly. Prior to proceeding with this task, the darkness manipulation was introduced.

The procedural context of the darkness manipulation was somewhat different for different sets of participants. Twenty-nine participants were told that the researchers were interested in studying perceptions of different ethnic groups, in particular African Americans, and that they should sit for 30 sec thinking about African Americans. The experimenter then left participants alone in the room with the door closed. The windowless room in which they were left alone was either well-lit by overhead fluorescent lights (light condition) or the lights were turned off so that the room was completely dark (dark condition). The other 23 participants were not asked to think specifically of any ethnic group. They were simply told that before they proceeded with the next task, they should clear their minds for 30 sec. The experimenter then left participants alone in the windowless room with the door closed. Again, the room was either well-lit by overhead fluorescent lights (light condition) or the lights were turned off (dark condition). The essential difference between these two versions of the darkness manipulation was whether participants were asked specifically to think about African Americans or not within the light/dark context. The results were largely unaffected by this distinction; therefore, participants' responses were pooled into two overall light and dark conditions.

Following the 30 sec in which participants were left alone in either the light or the dark, the experimenter returned and started participants on the IAT tasks that assessed stereotypic perceptions of Blacks. Each partici-

part completed the IAT alone with the door closed and with the overhead lights either on or off (depending on whether they were in the light or dark condition).

Upon completion of the IAT, participants completed another set of questionnaires, including the BDW (Altemeyer, 1988). An overall BDW score was computed as in Study 1 (Cronbach's $\alpha = .86$). Because this measure was completed at the end of the session, we tested whether BDW scores were influenced by the experimental manipulation. Reassuringly, the difference between mean BDW scores in the light and dark conditions was negligible, $t(50) = 0.79, p = .430$.

Results

In general, participants were highly accurate in categorizing stimuli on the two IAT tasks. (Accuracy rates were 95.76% and 94.79% on the unpleasant/pleasant and danger/safety IATs, respectively.) Response times on these two IAT tasks can be used to produce two different indicators of the extent to which Blacks (relative to the ethnic ingroup) are especially associated with evaluatively negative characteristics. The unpleasant/pleasant IAT yields an index of the extent to which Blacks are associated with evaluatively negative characteristics. The danger/safety IAT yields an index of the extent to which Blacks are associated with the more specific set of evaluatively negative characteristics connoting danger. To compute these two indices, the following steps were taken on the data generated by each of the two IAT tasks:

- a. Mean response times were computed within each block of trials. To eliminate unusually fast or slow response times that occurred when participants reoriented to the task at the beginning of each block of trials, responses to the first two trials at each block were omitted when computing these means.¹
- b. The mean response time on Block 3 (for which the African response key was identical to the unpleasant or danger response key) was subtracted from the mean reaction time on Block 5 (for which the African response key was identical to the pleasant or safety response key). If the resulting value—measured in milliseconds—is positive, it indicates that Blacks are differentially associated with unpleasant (for the unpleasant/pleasant IAT) or danger (for the danger/safety IAT). The magnitude of this value indicates the magnitude of this stereotypic association.

Consistent with previous IAT studies assessing ethnic stereotypes, results indicated a general tendency to differentially associate Blacks with unpleasant characteristics. Across all participants, the mean differential response time on the unpleasant/pleasant IAT was

TABLE 2: Experiment 2: Effects of Belief in a Dangerous World (BDW) and Darkness on Implicit Associations of Blacks With Danger and With Unpleasant

Predictor	B	β	t	p
Danger/safety IAT:				
Implicit association of Blacks with danger				
BDW main effect	20.82	.11	0.81	.422
Darkness main effect	-35.62	-.19	1.41	.164
BDW \times Darkness interaction	49.56	.26	1.93	.060
Unpleasant/pleasant IAT:				
Implicit association of Blacks with unpleasant				
BDW main effect	17.02	.07	0.52	.604
Darkness main effect	-28.12	-.12	0.88	.384
BDW \times Darkness interaction	32.88	.14	1.01	.319

NOTE: IAT = Implicit Association Test.

124.39 ms, a value that is clearly different from zero, $t(51) = 3.95, p < .001$. On the danger/safety IAT, the mean differential response time was also strongly positive, $M = 140.98$ ms, $t(51) = 5.44, p < .001$, indicating that participants tended to differentially associate Blacks with danger.

To examine whether these effects were influenced by BDW and darkness, separate regression analyses were conducted on the two different IAT indices. For these analyses, the darkness variable was coded -1 or 1 (as in Study 1) and BDW scores were transformed into z scores. An additional predictor variable corresponding to the BDW \times Darkness interaction effect was computed by taking the multiplicative products of these two variables. These three predictors were entered simultaneously in a pair of regression analyses. In one analysis, the dependent variable was the differential response time index from the danger/safety IAT. In the other analysis, the dependent variable was the differential response time index from the unpleasant/pleasant IAT. Results of both regression analyses are presented in Table 2.

Results on the danger/safety IAT index reveal that neither BDW nor darkness had substantial main effects but that the BDW \times Darkness effect was of a magnitude that cannot easily be attributed merely to sampling error, $\beta = .26, p = .060$. (A directional test of the null hypothesis indicates that $p = .030$ for the specific BDW \times Darkness interaction effect observed here.) This interaction is illustrated in Figure 2. Correlations reveal that BDW had a slightly negative relation with this IAT index among participants in the light condition ($r = -.15, p = .475$) but had a substantially positive relation in the dark condition ($r = .39, p = .043$). Only under conditions of ambient darkness did chronic beliefs about danger positively predict the extent to which Blacks were stereotypically associated with characteristics connoting danger.

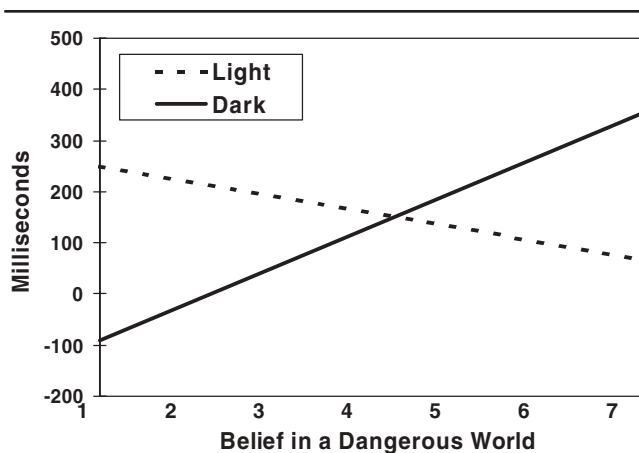


Figure 2 Study 2: Regression lines indicating the predictive effects of BDW on the danger/safety IAT index, in the light and in the dark.

NOTE: BDW = Belief in a Dangerous World Scale, IAT = Implicit Association Test.

Weaker effects were observed on the unpleasant/pleasant IAT index. (For the BDW × Darkness interaction, $\beta = .14, p = .319$.) Separate correlations reveal essentially no predictive effect of BDW in the light condition ($r = -.07, p = .752$) and only a weakly positive effect in the dark condition ($r = .23, p = .251$).

A deeper examination of the data revealed no meaningful moderating effects of participant’s ethnicity or sex. Given the small sample size (i.e., there were only 11 men and these men were distributed unevenly across conditions), these noneffects, including the failure to replicate the sex effects observed in Study 1, are best interpreted with great caution.

Discussion

The primary results replicate exactly the results found in Study 1. (A comparison of correlation coefficients reveals that the effect sizes were virtually identical across the two studies.) Again, the predictive effects of BDW on stereotype activation appear to be specific to conditions in which the measures of stereotype activation are preceded by a period of ambient darkness. And again, the effects observed in the dark condition were observed most strongly on the activation of stereotypes that most directly connote some sort of physical threat.

The use of IAT methods in Study 2 addressed some methodological limitations of Study 1. These methods allow one to obtain a measure of the extent to which stereotypic attributes are more highly associated with Blacks than with ethnic ingroups. The results revealed that ambient darkness and chronic beliefs about danger do not merely interact in activating cognitions about

danger but that they interact in activating cognitions specifically linking danger with Blacks. An additional benefit of IAT measures is that responses are not easily feigned (even if participants are aware of what is being measured). Thus, the results reflect not public reports of stereotypes but rather the ethnic stereotypes that really do come to mind.

GENERAL DISCUSSION

Under predictable circumstances, chronic beliefs about vulnerability to danger are associated with the activation of stereotypic beliefs about Blacks. Just as the perception of physical threat can precipitate overtly aggressive thoughts and actions, so too it can precipitate the more subtle sort of antisocial response represented by derogatory ethnic stereotypes.

This relation between perceived vulnerability to danger and derogatory stereotypes is constrained in two important ways. The relation occurs most strongly and directly within certain domains of stereotypic perception, and it is specific to certain situations.

Domain-Specificity: Stereotypic Perceptions of Dangerousness

Within the environmental context (ambient darkness) in which it exerted an impact on stereotype perception, belief in a dangerous world was most strongly correlated with the stereotypic perception linking Blacks with hostility, untrustworthiness, and other highly danger-relevant traits. The correlation with equally derogatory but less danger-relevant stereotypic perception was much weaker. (In fact, some additional regression analyses revealed that this weak effect disappeared entirely when effects on the highly danger-relevant stereotypes were controlled.) The most straightforward interpretation is that when triggered by darkness, beliefs about danger exert effects most directly on that specific set of stereotypic perceptions that are most functionally relevant to those beliefs.

This may be just one of many examples in which specific personality and/or contextual variables exert influences on fairly specific elements of stereotypic perception. There is an easy tendency to assume that stereotypes are monolithic cognitive structures characterized primarily by evaluative negativity (or positivity). This assumption leads easily to the further assumption that any one evaluatively loaded aspect of a stereotype (e.g., “Blacks are ignorant”) can serve as a proxy for any other equally evaluative aspect of the stereotype (“Blacks are hostile”). Both assumptions are wrong. Stereotypes are highly dynamic knowledge structures composed of different elements that not only have evaluative implications but have different connotative implications as well. The results of the present studies suggest that we might

best understand the influences on stereotypes and prejudice by attending carefully to the effects that specific variables have on specific domains of stereotypic content.

Situation Specificity: The Moderating Effects of Ambient Darkness

Belief in a dangerous world predicted stereotype activation only when individuals perceptually encountered Blacks under conditions of ambient darkness; the effect was not found in more well-lit conditions.

This particular type of Person \times Situation interaction differs from many other Person \times Situation interactions in the realm of social perception and behavior. In many cases, the effects of attitudes and personality variables on perception and behavior are strongest within situations that are experientially weak but disappear in situations that stimulate stronger affective and motivational reactions (Ajzen & Fishbein, 1980; Snyder & Ickes, 1985). Within the realm of stereotypes, for instance, Schaller et al. (1995) found that individual differences in cognitive style predicted stereotype formation more strongly in a weak situation than in strong situations that were more highly charged with interpersonal anticipation. The present results reveal exactly the opposite sort of Person \times Situation interaction. The onset of ambient darkness almost certainly precipitates a stronger affective and motivational experience than does ambient light. And yet, it was within the context of darkness that the effects of individual differences were observed. Just as certain strong situational contexts can mute the effects of some personality variables on stereotypic perceptions, other strong contexts may act as triggers that release the effects of other personality variables on stereotypic perceptions.

Just what is it about ambient darkness that served as this sort of trigger? Darkness surely has a variety of consequences on phenomenological experience, and the present studies were not designed to measure these many aspects of experience. Nevertheless, the results do offer some clues that allow us to comment on some of the possible reasons that darkness had its effects.

Explanations based on anonymity (people might feel more anonymous in the dark and so may more freely express derogatory stereotypes) cannot easily account for the IAT results obtained in Study 2 or for the fact that the effects occurred more strongly on danger-relevant stereotypes than on other equally derogatory stereotypes. Explanations based on arousal and drive theory also cannot offer a complete account of the results. Although it is likely that arousal is increased in the dark—especially among people who are more dispositionally fearful—and arousal might facilitate the activation of highly available stereotypic cognitions, the

consequences of such a process should be observed equally strongly on all highly derogatory and/or highly stereotypic perceptions. This was not the case. For the same reason, it is difficult to develop a complete explanation based on either ego threat or enhanced salience of mortality under conditions of darkness, both of which imply consequences that are fairly general rather than limited primarily to the domain of highly danger-relevant perceptions.

In contrast, a more complete explanation can be deduced from an evolutionary perspective on intergroup cognition (Kurzban & Leary, 2001; Neuberg, Smith, & Asher, 2000; Schaller, 2003). Within such a framework, specific stereotypes and prejudices are hypothesized to have conferred functional benefits—such as the avoidance of threat to physical well-being—to individuals in ancestral environments. Consequently, these stereotypes and prejudices may be activated in contemporary environments in response to perceptual objects connoting this sort of threat. The functional logic of this framework implies that stereotypic beliefs that are most functionally relevant to threat avoidance will be most strongly activated, especially when additional information indicates that the threat is especially acute. Thus, chronic concern about interpersonal dangers have their strongest influence on specific stereotypic perceptions that connote danger, and this is most likely to occur when features of the immediate context suggest an increased vulnerability to danger. Some contextual features may connote vulnerability as a result of some rational appraisal of the situation (e.g., real ongoing conflict between ingroup and outgroup). Other contextual features may connote danger at a more heuristic level. Ambient darkness seems to fit in the latter category. Darkness may be associatively linked to thoughts of evil, death, and danger; it may automatically precipitate emotional responses consonant with those thoughts. Therefore, even though the mere fact of ambient darkness may not logically imply any greater threat of bodily harm at the hands of ethnic outgroups, darkness may nonetheless lead more dispositionally fearful people to react to ethnic outgroups with greater prejudice.

Persons, Situations, and the Dynamic Construction of Stereotypes

The prejudiced personality is comprised by, among other things, a variety of sociopolitical attitudes and values (Crandall, 1994; Sidanius & Pratto, 1993), specific elements of self-concept (Crocker & Luhtanen, 1990; Gough & Bradley, 1993), and different aspects of cognitive style (Allport, 1954; Neuberg & Newsom, 1993; Schaller et al., 1995). The complexity of this portrait is evident in what is perhaps the most sustained line of inquiry into the prejudiced personality: research on

authoritarianism (Adorno et al., 1950; Altemeyer, 1988; Stone et al., 1993). That authoritarianism predicts ethnic prejudice is well documented. The reasons why are less clear because authoritarianism—as conceptualized and as measured—is a multifaceted personality syndrome composed of multiple, conceptually distinct psychological constructs. Some of the more focused studies on personality and prejudice illuminate the predictive utility of some of those specific constructs, particularly those pertaining to ideology and cognitive style. Perceived vulnerability to danger seems to represent another important facet of authoritarianism. Fear occupies an important role in some conceptualizations of authoritarianism, and it has been argued that inquiry into fearful feelings may be necessary to understand completely the links between authoritarianism and acts of ethnocentric violence (Suedfeld & Schaller, 2002). It is within this context that the present studies complement the small amount of previous research on beliefs in a dangerous world (Altemeyer, 1988). The accumulating evidence suggests that chronic beliefs about danger are an important part of the prejudiced personality.

The impact of personality on prejudice cannot be fully comprehended, however, without attention to the cognitive underpinnings of prejudice and to the impact of context on those cognitive processes. It is sometimes convenient to think that once a person has formed some belief about a particular group of people, the belief remains stable across time and space. This is not so. Beliefs and knowledge structures pertaining to a group are, to some extent, constructed anew each time that a person mentally encounters that group (Kunda & Thagard, 1996; Smith & DeCoster, 1998). The context of that encounter exerts considerable impact on that cognitive construction process. The same person will be more prejudiced in some situations than in others.

Most inquiries identifying situational influences on stereotypes have focused on elements of the social context—interpersonal goals, normative constraints, the specific nature of intergroup relations, and so forth (Ellemers & van Knippenberg, 1997; Schaller, Rosell, & Asp, 1998). The present results reveal that a purely physical variable—the presence or absence of ambient light—also affects the construction of ethnic stereotypes.

This not only has interesting conceptual implications but potentially important practical implications as well. Just as previous scientific inquiries into stereotypes and prejudice have overlooked the consequences of ambient light and darkness, it is unlikely that ordinary people are aware that darkness has the effects it does, so they are unlikely to guard against its psychological consequences as vigilantly as they might resist the effects of more obvious contextual influences. These consequences may then become manifest on a regular basis in the lives of a

large number of people. After all, although it is possible to avoid many undesired social situations, it is virtually impossible to avoid finding oneself occasionally in the dark.

NOTE

1. Alternative methods of cleaning response time data have been used in other studies employing Implicit Association Test (IAT) methods. For instance, Greenwald, McGhee, and Schwartz (1998) reset responses slower than 3,000 ms and faster than 300 ms to be exactly 3,000 ms and 300 ms, respectively. Statistical analyses on reaction time data cleaned in that manner revealed results that were virtually identical to those reported here. We also conducted statistical analyses on uncleaned reaction times (neither omitting nor resetting discrepant responses); the descriptive results were virtually identical to those reported here, and the inferential results were only trivially weaker.

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